THE GENERAL PRACTITIONER AND A MIDWIFERY SERVICE

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FEW, branches of medical practice have shown more rapid technical progress than obstetrics; midwives, general practitioners and obstetric specialists have all had to put on pace to keep up with the new standard. The successful practice of modern midwifery (or, if preferred, of the new obstetrics) depends on team work, and it is the general determination that the midwifery team shall have no tail, or a very short one.

A generation ago midwifery practice was rather crude and the results relatively poor; the obstetric mortalities (maternal, fœtal and neonatal) were high, and permanent disability and impaired health were far too frequent amongst the survivors. There was hardly any opportunity for postgraduate training, for few maternity hospitals had resident posts and rarely had any medical school hospital a resident obstetric post of the "first assistant" type. None of the London medical school hospitals had in-patient maternity departments. Obstetric specialists themselves suffered from lack of apprenticeship training; they had to rely on getting elected to the honorary staff of the few existing maternity hospitals and gain their experience as best they could. Medical students had scarcely any clinical teaching; they were sent out "on the district" after they had finished their anatomy and physiology and before they had any knowledge of medicine or surgery, let alone of midwifery. The British Medical Association and the obstetric teachers fought hard for the drastic reforms that were so long overdue, with the slow result that medical students now have a good academic training in the principles of obstetrics, with a fair vocational training in the management of normal labour and the detection of the more obvious complications.

Furthermore, every medical school now has an in-patient obstetric department (although in most of the London medical schools the number of beds is deplorably small) or an attached maternity hospital, all with one or more resident posts and some with senior resident posts of the first assistant or registrar type. The larger Local Authorities, too, have large maternity units in their general hospitals, often with obstetric consultants attached, so that, all in all, the facilities for postgraduate training are fairly numerous, although they fall far short of what is required.

MATERNAL MORTALITY

The maternal mortality rate—which is a good index of the quality of midwifery practice—reached a low record of 3·3 per 1,000 in 1937 and, what is most significant, has fallen steadily ever since; in 1943, the most recent year for which the

figure is published, the rate (including abortion deaths) was 2·3 per 1,000, being 46 per cent. lower than for 1920. These are, of course, the average yearly rates (for all England and Wales); but when the country is divided up into areas, and still more when individual county boroughs are taken, the story is not so good, for a sort of pepper-and-salt pattern of good and bad areas and boroughs is revealed. This aspect of the problem has been discussed in the recent "Report on a National Maternity Service" published by the Royal College of Obstetricians and Gynæcologists (1944), in which a table shows the highest and lowest rates (excluding abortion deaths) for the four years 1939-1942 of the seven lowest and seven highest county boroughs, the average rate for England and Wales for that period being 2·25 per 1,000 The two highest boroughs stood at 4·2 and the two lowest at 1·0 and 0·7 respectively. In another table are shown the maternal death rates for 1938 for different geographical regions. Greater London was the lowest at 2·1; the North of England being 3·4, Wales 4·6 and Scotland 4·9. Clearly something is wrong with the maternity service in these black areas. The figures concern the same sort of folk, eating the same sort of food; climate makes no difference and the varying social and economic conditions cannot *directly* account for such great disparity.

A disturbing thing about maternal mortality is the high proportion of deaths due to what has been called a "primary avoidable factor" ("Ministry of Health Interdepartmental Committee on Maternal Mortality," Interim Report, 1930; Final Report, 1932). In the large series of cases examined the Committee found that the percentage of "avoidable" maternal deaths was as high as 46. The inference drawn was either that the standard of midwifery practice was not high enough, or else that knowledge of the best methods of treatment in these cases was still inadequate. It is known that even at the present time, when the national maternal mortality is just about half what it was when the above investigations were made, the percentage of preventable deaths is still very high.

For the first four years of the war I was obstetric consultant to a county for which rate was below the national rate, and one of my duties was to investigate every maternal death that occurred. Out of 100 consecutive deaths (excluding abortions) I came to the conclusion that 50 were avoidable in the sense used by the Committee cited above. A my standard of avoidability (or preventability) was not unreasonably high, but well with the scope of a well-planned and well-manned maternity service (under "well-manned I include the whole team—midwives, general practitioners, obstetric specialists an administrators).

In the report of the Royal College of Obstetricians and Gynæcologists the likely reasons for the striking fall in the maternal mortality rate are considered The view is taken that advances in general medicine are more responsible improvement in the standard of obstetric practice.

"The more prevalent use of blood and plasma transfusion, the use of the sulphonamid group of drugs, the prevention of 'droplet infection' by the use of face masks, the of contact infection by modern barrier nursing, and the lowering of infection in hospital by bacteriologically controlled administration and discipline"

are regarded as the factors that have been most potent in lowering the rate. The comes the significant statement:—

"Our experience as obstetric consultants as well as our scrutiny of the records of deaths leads us to believe that the average standard of obstetric practice has improved only a little during the last few years."

THE PRESENT POSITION IN GENERAL PRACTICE

Having, as I hope, prepared the ground by these preliminary remarks, I now come to consider the real subject of this article, namely, the general practitioner and a midwifery service. What is .the trend of general practice in relation to midwifery? The trend is, in my opinion, definitely in the direction of midwifery being practiced only by those general practitioners who take a special interest in it and who have, by one means or another, acquired experience and skill. My personal observations as a consultant leave no doubt in my mind that more and more practitioners are taking less and less interest in the work. In many partnerships, in urban areas at all events, the midwifery is done by one partner who very likely has held a resident obstetric post and who becomes progressively more skilful, especially if he has some beds in the local hospital for difficult cases and an obstetric consultant available to help when required. Such practitioners—and there are a good many of them now up and down the country—become, within their scope, most reliable and skilful, although their ceiling cannot be expected to be as high as that of a fully trained obstetrician with active hospital, teaching and research interests; and, speaking of that, what does "fully trained" mean? To tell the truth, the obstetric specialists themselves are not satisfied with their present training criteria.

To the Royal College of Obstetricians and Gynæcologists must be given the credit of being the first Medical College to require a period of approved postgraduate training as a condition for admission to its membership examination. The College proposes, as soon as there are sufficient training centres of the ·equisite standard, a postgraduate pre-membership training period of five years.

So much for my personal observation of the trend of midwifery practice. What about the much more significant pronouncements of public health and other bodies concerning this field of medicine? Definite views have been stated by the Royal College of Obstetricians and Gynæcologists, the Ministry of Health, the Goodenough Committee on Medical Schools, the Department of Health for Scotland, the Maternity Services Committee for Northern Ireland (1943), the College of Midwives and the Central Midwives' Board.

The Ministry of Health has stated ("Report on an Investigation into Maternal Mortality and Morbidity," 1937):—

"It is only those practitioners who show special interest in, and have special experience of, midwifery, who should be called to the assistance of a midwife."

This refers, of course, to "medical aid" calls, which are sent out for about 40 per cent. of all cases attended by midwives.

In the Maternity Services (Scotland) Act, 1937, there is no requirement that a general practitioner working within the service shall have had special experience; but there are clear restrictions in the range of his activities. The Department of Health recommends:—

"At all stages of pregnancy, labour and the puerperium, the practitioner shall give such treatment as is within the competence of a general practitioner, for all conditions requiring it, and shall, before undertaking any procedure other than minor manipulative or instrumental interference, consult with or call in the obstetrician appointed by the local authority."

The Northern Ireland Report, with reference to general practitioners, states:—

"Preferably those who have undergone additional training in obstetrics, or who have

shown a special aptitude (sic) for this kind of work should be appointed. Such practitioners will be qualified to deal with any ordinary emergency (sic) which may arise during pregnancy, labour or the puerperium."

The report does not throw any light on the meaning of "special aptitude" or "ordinary emergency."

The views expressed on the teaching and practice of obstetrics by the Goodenough Committee seem to coincide closely with the recommendations of the new Maternity Services Act for Scotland:—

"Whilst the training of a medical student should fit him to conduct efficiently cases of normal labour, and to recognize when specialist advice or institutional treatment becomes necessary, it must be recognized that it does not, and cannot, fit him to deal with abnormalities. In other words, a general practitioner should not deal with abnormal obstetric conditions, beyond possibly those involving only 'minor manipulative or instrumental interference,' unless he has obtained additional experience by holding postgraduate appointments in maternity hospitals or departments."

As regards the teaching of medical students, after stating the present recommendations of the General Medical Council (briefly, a six-months' course, two-thirds in obstetrics and one-third in gynæcology, including a two-months' period of residence in a maternity hospital or department) the report states:—

"The evidence received by us supports the view that a course as advocated by the G.M.C. is necessary even though in future general practitioners may refrain from dealing with abnormal conditions unless they have had adequate postgraduate training."

The College of Midwives and the Association of Supervisors of Midwives have repeatedly urged that when midwives require help it should always be possible for them to obtain the services of a practitioner with special midwifery experience. A few local authorities employ a small panel of skilled practitioners to render "medical aid" to their municipal midwives.

The Royal College of Obstetricians and Gynæcologists believes that the qualification for general practitioners to work in a National Maternity Service should be special and approved postgraduate experience. It seems to me that the whole position is so well put in the recent Report that the relevant section may be quoted in full:—

"It is true that every registered medical practitioner is entitled by law to practice all branches of medicine, and that it would be an interference with that right to make midwifery practice conditional on special postgraduate study and the possession of a special diploma. But it is equally true that his obstetric work would be better done and his obstetric patients better served if he had had special experience in the work.

We believe that general practitioners should take an important share in a National Maternity Service; but our belief is equally strong that it is not an advantage to childbearing women that any practitioner should practise obstetrics and be employed in a National Maternity Service, but only those with special experience. General practitioners with special experience are of two kinds. Firstly, those who for years have been specially interested in obstetrics in their practices and have become skilful and experienced in that way. Secondly, those who after qualification have held a resident obstetric appointment in an approved hospital. This College grants a diploma in obstetrics to general practitioners and regards the prescribed postgraduate training as of much more importance than the passing of the examination.

We believe that this principle should hold good not only for general practitioners who attend confinements in local maternity Centres and patients' homes, and who take midwives' aid calls, but also for those who do antenatal work, whether in special antenatal clinics or in health centres.

There is a view that antenatal work can be divided into two parts, obstetrical and medical, and that the two can be separated in practice, special experience being demanded only for the former. Most of us hold the view that in this work divided responsibility is not good,

the obstetric and medical sides being closely interwoven. Nevertheless, it is highly desirable that the practitioner responsible for the obstetric care of the patient should be closely associated with the family practitioner, whose knowledge of the general health, nutrition, housing and economic status of the patient may be of the utmost importance. Special experience and training in care of the baby is also essential, as the present curriculum pays relatively little attention to this subject.

The important share that general practitioners would take in the Service would thus be: to have charge of the beds at the local maternity Centres, to do antenatal work at antenatal clinics and at health centres, to do domiciliary midwifery themselves, and to take medical aid calls from midwives.

To achieve the true and desirable team spirit, integration of the work of the personnel is a paramount necessity, and we know of no better way of making a general practitioner feel that he is a member of the team than of giving him the opportunity of being for periods of time closely associated with the work of the Centre.

The present system often places general practitioners in impossible situations. Unaided, and in unsuitable surroundings, they may have to deal with complications that would test the promptness and skill of the most eminent specialists. It means just this: that general practitioners and their patients should be supported and protected by a maternity service that makes provision for such situations; that provides emergency transport of specialists to patients and patients to maternity Centres; and of resuscitation teams that, in many obstetric emergencies, are able seemingly to avert certain death. Indeed, the resuscitation team is usually more urgently wanted than the obstetric specialist and then it should be the first on the spot."

Two comparatively recent movements in British midwifery practice are of great significance in the subject under consideration. One is the progressive rise in the number of institutional births; the other is the number of births now attended by midwives. In England and Wales as a whole the number of institutional live-births recorded in 1927 was 15 per cent. of the total and in 1937 was 35 per cent. (Registrar-General's Statistical Review for the year 1937). For Liverpool (as an example of a large city) the percentage was 23 for 1929 and 49 for 1938; and in the County of London, in 1938, no less than 69 per cent. of the births were in institutions (private nursing homes, as well as voluntary and municipal hospitals, are included in all the above figures). It is interesting to note that the regional distribution of institutional confinements shows great variation, from 17 per cent. in Wales to 47 per cent. in the South-east of England (including Greater London).

The number of births attended by midwives in their capacity as midwives (and not merely acting as maternity nurses, with practitioners) was in 1942 approximately 75 per cent. of the total births of England and Wales. The dependence of midwives on skilled medical help is shown by the large number of cases in which they send for "medical aid." In 1942, for example, the Queen's Nurse-midwives and Village Nurse-midwives summoned medical aid in 34 per cent. of cases for the mother and in 6 per cent. for the infant. Nothing, I submit, could demonstrate more convincingly than these "medical aid" figures the responsible part played by general practitioners in British midwifery.

CONCLUSION

The foregoing quotations and figures can leave no doubt whatever about the present trend. That midwifery practice should be restricted to general practitioners with special experience and special interest seems to be a natural process of evolution in which the best features of the old system are kept and modified to meet the new conditions. The reform is coming, and will continue to come, from within; for the general practitioners themselves will no doubt see to it.

DIFFICULT LABOUR

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THE greatest spectre of child-birth to the pregnant woman is the possibility of a difficult labour. Many women approach labour in a state, to say the least of it, of mild apprehension. This may be a result of the attention which has been focused on maternal mortality in recent years in the press or of "old wives' tales" which have circulated from time immemorial amongst expectant mothers and which will probably continue to do so. To the busy practitioner who is practicing midwifery there is no greater source of anxiety and worry than a case of difficult labour. Obstetricians have published textbooks on this one subject alone (Hermann, 1929; Cameron and Hewitt, 1926) and it is obvious in an article of this kind that it would be impossible to deal with so wide a subject in any detail. There are, however, certain general observations which apply to all difficult labours to a greater or less extent and which are worthy of some consideration.

The prevention of difficult labour and of the patient's fear of such an ordeal should be among the chief aims of adequate antenatal care. Antenatal care all too frequently comprises urine boiling and certificate signing, with a short general abdominal examination in the later months of pregnancy. Cases of dystocia in the main are due either to contracted pelvis, malpresentation or malposition, or to uterine inertia. The first two conditions should always be diagnosed antenatally. Uterine inertia can only be diagnosed after labour has begun.

DYSTOCIA ASSOCIATED WITH CONTRACTED PELVIS

The question of contracted pelvis is not solely restricted to actual reduction in the bony measurements of the pelvis but here includes the wider question of disproportion. Those who practice midwifery in industrial areas, especially where rickets is prevalent, will always be on the lookout for bony contraction, and in this respect it is worthy of mention that the grosser pelvic deformities are to-day becoming something of a rarity. The extreme rachitic deformities which were common in the industrial areas twenty to thirty years ago are now fortunately much less common, but the disappearance of the more obvious signs of rickets often lulls the practitioner into a false sense of security, as it is often the case that a minor degree of rachitic deformity exists in the pelvis when there is no gross deformity of the extremities to draw attention to this. It is therefore only by the most careful pelvic examination in every case, using not only external pelvimetry but internal digital examination, that deviations from the normal will be detected, and minor or "masked" cases of pelvic contraction recognized.

It is readily conceded that *external pelvimetry* alone is extremely fallacious, but it is a good and careful habit which on occasion may lead to the suspicion of contraction which might otherwise have been overlooked.

Internal pelvimetry by digital examination is difficult to perform and does not consist merely of an attempt to feel the promontory. The examining fingers should be swept around the pelvis as far as possible, in order to appreciate its contours, and there is no more useful estimation than that of the distance between the spine

of the ischium and the sacrum, the sacro-spinous ligament. In a normal pelvis two fingerbreadths is a rough estimate of the distance between the ischial spine and the sacrum. When this distance is decreased a contraction in the cavity in the plane of least pelvic dimension may be suspected. Caldwell, Moloy and D'Esopo (1936) have stressed the value of this measurement and its importance in dystocia.

There are many large areas in Britain where rickets is virtually absent and contracted pelvis is something of a rarity, but in these same districts at any time there may be encountered one of the congenital non-rachitic forms of pelvic contraction, the most common being the male or funnel-shaped pelvis described by Caldwell and Moloy (1933) and Thoms (1935) as the android pelvis. Other variations, such as the anthropoid, occur less commonly but none the less generally.

The best time to carry out internal digital pelvimetric examination is between the fourth and seventh month. By that time the uterus is clear of the pelvis and the foetal head has not become sufficiently large to impede the examination. When disproportion is present, this is usually seen in the failure of the head to engage by the thirty-sixth week, or by the head remaining high and only partially engaged. In such a case an examination under anæsthesia and an estimation of the amount of disproportion by Munro Kerr's method are often of value, and in all such cases recourse to radiographic pelvimetry is essential. Moreover, in every case in which the slightest doubt exists in the mind of the practitioner responsible for the antenatal care as to the capacity of the pelvis, it is wise to resort to *X-ray pelvimetry*. The claim that every primigravida should have her pelvis X-rayed is an extravagant one, as the incidence of contraction in this country is less than 3 per cent., but it would be of considerable advantage if many more women were X-rayed than is customary to-day when there is a suspicion of pelvic contraction. The mere negative evidence that the pelvis is normal gives the accoucheur added confidence in his conduct of the labour. When radiographic pelvimetry is desired it should be stressed that this work can only be carried out by a radiologist who is accustomed to the technique and who is prepared to use one of the well-tried methods, as advocated by Thoms (1935), Caldwell and Moloy (1933), Roberts (1927), and others. Haphazard methods of radiographic pelvimetry produce entirely fallacious results which are likely to cause unnecessary despondency and alarm.

It is almost axiomatic that when there is evidence of pelvic contraction or disproportion the patient is not suitable for domestic confinement and her labour should be conducted in an institution. This might appear to be a truism, but it is not uncommon to find such patients having the first part of their labour conducted in their home only to finish labour in an exhausted state in an institution.

DYSTOCIA ASSOCIATED WITH MALPRESENTATION AND MALPOSITION
With regard to malpresentation and malposition, these can usually be detected with a reasonable degree of ease when a careful abdominal palpation is carried out on at least two occasions after the thirty-sixth week of pregnancy. Again, when there is any doubt in the mind of the examiner, recourse should be immediately had to radiology. Malpresentation, such as breech or transverse lie, can usually be corrected by external version, which is best carried out at the thirty-sixth or thirty-seventh week, and in the case of the less common malpresentations—face and brow —when correction is difficult or impossible, the question of Cæsarean section can be considered.

The most common cause of difficult labour in a primigravida is undoubtedly *occipito-posterior position.* The usual abdominal palpation may reveal a multiplicity of limbs in the anterior aspect of the uterus. It should not be presumed, however, that the fœtal heart will always be best heard in the flank as, in a persistent occipito-posterior, it is not uncommon to hear it directly and clearly in the midline, anteriorly. Windeyer's sign, namely that the shoulder is displaced towards the flank in an occipito-posterior, is most valuable when it can be elicited, and here again when there is any dubiety as to diagnosis an X-ray photograph, particularly a lateral view, will confirm or dispose of the suspicion that the case is occipito-posterior.

It may be asked what value will accrue from diagnosing an occipito-posterior antenatally when it is fairly generally agreed that nothing can be done to rectify this malposition before the onset of labour. (There are few to-day who place much reliance on Buist's pads or postural treatment.) Surely the answer to this question is that when an occipito-posterior exists in a primigravida, the practitioner who is aware of its presence is prepared and can prepare the patient's relatives, if need be, for a labour which is likely to last longer than usual. Such a warning will often save him from the importunities of anxious relatives, and such knowledge will influence his treatment of the patient in the early stages of labour.

DYSTOCIA ASSOCIATED WITH UTERINE INERTIA

It has often been said that trial labour is an admission of weakness on the part of the obstetrician and that he should be able to differentiate a case which can achieve vaginal delivery from the case which will require Cæsarean section. If the critics of trial labour were able to forecast in any given case, before the onset of labour, the type of uterine contractions which would occur when labour started, they would have a sound basis for their view. As the position stands to-day, however, it is impossible to ascertain before labour begins how the uterine musculature will behave. All labour is in the nature of a "trial of labour." This is especially so in primigravidæ, but even in the multiparous patient it is never certain that the uterus will behave in labour as it has done in previous labours.

The importance of the quality of uterine contractions in difficult labour is seldom stressed in this country as it should be, for, although much attention has been directed to primary uterine inertia, little has been given to the infinite variations of uterine muscular contraction which, whilst falling short of absolute inertia, might be classed as irregular uterine action. German and French obstetricians, notably Frey (1933), Held (1934) and L'Orande (1937) have written extensively on this aspect of labour and have evolved methods of "pain counting" and graphic measurements of uterine contraction. Whilst it is perhaps not necessary to carry out such detail as these Continental workers would advocate, it is of the greatest importance to observe the quality, frequency, and duration of uterine contractions if an accurate prognosis is to be made in a case of difficult labour.

The value of observation of the quality of uterine contractions can be exemplified by quoting from an analysis of the cause of death in one hundred patients who died following difficult labour due to pelvic contraction (MacLennan, 1944). In this series of one hundred fatalities it was noted that there were only *nine cases* of rupture of the uterus, and these occurred in parous women with strong uterine contractions. There were no deaths from rupture of the uterus among the primigravidæ with strong uterine contractions. Rupture of the uterus in a primigravida

with dystocia is indeed a most rare occurrence. In a primigravida whose labour is difficult it is therefore obvious that strong uterine contractions are desirable when delivery is to be effected by the vaginal route. Equally strong uterine contractions in a multipara, however, may be fraught with danger, as the weakened uterus may rupture at any time. In the series mentioned, weak uterine contractions in the primigravidæ resulted in prolonged labour, and a much greater incidence of obstetric shock followed the ultimate delivery. In general it might therefore be said that strong uterine contractions which are favourable in primigravidæ may be unfavourable in multiparæ. Contrarily, in primigravidæ, weak uterine contractions cause prolongation of labour and are often followed by a degree of shock which is not usually encountered in a parous woman with similar weak contractions.

SOME GENERAL CONSIDERATIONS ON THE TREATMENT OF DIFFICULT LABOUR

Difficult labour due to any of the above causes is best conducted in a hospital or nursing home in which the practitioner will have all the advantages of a trained staff and adequate surroundings for timely interference immediately this may become necessary. Obviously the detailed treatment in labour will depend upon the causes of dystocia, but there are three general considerations of difficult labour which require special attention and apply to all cases:—(1) Maintenance of the patient's morale; (2) adequate rest; (3) adequate nutrition.

Morale.—A practitioner who has looked after his patient antenatally will embark on the confinement having gained her confidence. He must not destroy this with specious promises of an early delivery, nor must he cause disquiet by apparent failure to appreciate her early discomfort. Such phrases as "you will be worse before you are better" can hardly be considered as encouraging. Although it is impossible to agree entirely with the tenets of Grantley Dick Reid there is much to be said for his approach to the patients, and a reasonable attitude on the part of the practitioner will help greatly in all difficult cases.

Rest.—In order to secure rest for a patient there is no more valuable drug than morphine, but its use should be confined to securing rest for a patient who is showing evidence of physical distress and who is not likely to be delivered within four hours of its administration. The normal time for sleep is at night, and if the practitioner appreciates that it is soothing for the patient whose labour is protracted to rest then, he will administer his sedatives at night rather than through the day, whenever this is possible. Haphazard injection of ¼ grain of morphine often needlessly protracts a difficult labour and it is not surprising in such cases that advance is arrested. Syrup of chloral (20 grains) and bromide (30 grains) are useful sedatives which can be freely repeated. They are not administered as often as they should be. Analgesia with gas and oxygen, or gas and air, are far too frequently withheld until the later stages of labour when they could be most usefully employed throughout the first stage in difficult labour.

Nutrition.—If the patient is to have strong uterine contractions it is essential that she should have an adequate glycogen reserve to ensure powerful muscular contractions. To do this it is essential that she should eat. Patients in labour are not inclined to eat or drink. They should be encouraged to do so, and the nourishment should be in the most easily assimilable form. A normal diet, when this can be tolerated, is desirable, but constant sipping of glucose drinks is of cc

when the patient refuses food because of sickness or nausea. There is a tendency to-day in institutional midwifery to administer intravenous drip dextrose on the slightest provocation, and it is not uncommon to find patients receiving several pints of glucose saline intravenously when the same result could be as easily secured by drinking. The intravenous drip alarms the patient unnecessarily and often destroys the vein which might be required for more effective use at a later stage. If the morale of the patient is high and she has reasonable rest and adequate nourishment she will be in a state of mind and body fit to withstand any operative interference which may prove to be necessary as a result of her dystocia, and if she is so prepared for the ultimate obstetric interference she will be saved from that 'most fearful sequel to difficult labour, namely, obstetric shock.

CÆSAREAN SECTION

Cæsarean section can at any time cut short and relieve a patient who is suffering from difficult labour and the performance of this operation is a great temptation to the inexperienced or unduly nervous obstetrician. The dangers which follow such a course of treatment have been widely commented upon, notably by Holland and Kerr (1932). The mortality rate following Cæsarean section lies somewhere between 1·6 and 2·2 per cent. As the mortality rate for the country varies around 0·3 and 0·4 per cent., it will be seen that Cæsarean section carries a five or six times greater risk to the mother than vaginal delivery. It should, however, be remembered that with the perfection of the technique of the lower uterine segment Cæsarean section the operation can be carried out to-day in cases which are potentially contaminated. Years ago, when the classical operation was the more popular, Cæsarean section was virtually ruled out when the patient had been in labour with the membranes ruptured for more than twelve hours. This is no longer the case, for not only has the lower uterine segment operation improved the outlook in the case of delayed labour but the introduction of the sulphonamide drugs has still further reduced the risk of post-operative disasters.

It is quite possible that the greater ease and safety with which Cæsarean section can be performed to-day is likely to result in a much greater use of the operation in cases of difficult labour. This would not be altogether a progressive step, as undoubtedly a successful delivery by the vaginal route will always be preferable; and if the art of obstetrics were to be confined to the performance of one relatively simple operation the obstetrician would tend to lose his skill in many alternative obstetric manœuvres. Moreover, his judgement—that rarest of commodities—would become narrowed to that of a mere surgical technician.

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MODERN VIEWS ON TOXÆMIA OF PREGNANCY

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THERE are several conditions which are grouped under the common term of "toxæmia of pregnancy," and the disease and syndrome with which pregnancy is at times complicated is so well known as to merit its description under this term.

It cannot be said that the different forms the disease takes can have any etiological significance, nor is there such a sharp distinction between one type and another as to merit a clinical classification. Nevertheless, if such diseases as occur in the earlier months of pregnancy, e.g., hyperemesis gravidarum, are excluded, and attention is confined to those complicating the later months of pregnancy, then the following conditions, which may be distinct or merge into one another, should be recognized:—

(1) Albuminuria of pregnancy.
(2) Pre-eclamptic toxæmia.
(3) Eclampsia.
(4) Toxæmia associated with placental hæmorrhage.
(5) Acute yellow atrophy.

PROBLEMS OF ALBUMINURIA

It will be noted that albuminuria of pregnancy and pre-eclamptic toxæmia are put in separate groups; not that there is any sharp distinction between the earlier symptoms and signs in each group, but because it is generally recognized that there is a toxæmic state in which it is most unlikely that fits will develop, and another in which fits are imminent, and are indeed prone to develop even with the patient under the most careful supervision and treatment. Too often the terms are used as synonyms because the cardinal sign common to each is pregnancy with some degree of albuminuria, but as both of the conditions are also associated, in the majority of cases, with some degree of hypertension and œdema, then the term "hypertensive toxæmia," which has been used to designate the condition, is as inadequate as the term "œdema of pregnancy," which has never been used to designate the disease. Not all cases of hypertension in pregnancy develop albuminuria, and if the physical sign of hypertension is the only deviation from an otherwise normal pregnancy, then little justification can be given for the description of such a condition under the term toxæmia, even though it is universally recognized that the large bulk of toxæmic cases have this hypertension. Indeed, the majority of hypertensive pregnant women ultimately pass into a toxæmic condition in which albuminuria sooner or later develops. It cannot, on the other hand, be denied that if albuminuria develops as a result of pregnancy and because of this alone, then that pregnancy has passed out of the category of normal and entered the class of toxæmic pregnancies. Should, however, albuminuria appear during a pregnancy

and be a manifestation of pre-existing and permanent kidney disease, or be associated with and arise as a result of anæmia, then such albuminuria is not evidence of toxæmia of pregnancy, and will undoubtedly be accompanied by such other physical signs as are recognized to be manifestations of the disease causing the albuminuria. The fact that the added strain of pregnancy so aggravates this disease as to make apparent this hitherto latent physical sign, in no way conduces to a conclusion that the presence of albumin alone should justify a diagnosis of albuminuria of pregnancy. In fact, there are many conditions in pregnancy associated with albumin in the urine which are not toxæmias, and must not be classified under this heading.

ETIOLOGICAL FACTORS

Little will be said about the etiology of toxæmia in pregnancy although a voluminous literature has grown up dealing with the various theories. Suffice it to say that none is entirely satisfactory, and, whilst a vast amount of accurate observation and careful scientific experiment has been carried out, directed to elucidating the origin of the toxæmic state of pregnancy, the very complexity of manifestations in this condition suggests that there are a considerable number of causes leading to a deviation from the normal in a given pregnancy. This deviation may be displayed by a superficial resemblance in its manifestations, and yet the pathological basis and significance are as varied as the combinations in number and degree which are capable of being made up from the limited number of symptoms and physical signs known to be associated with all types of the disease. Browne (1944), whose work on the toxæmias of pregnancy is so widely known, has made an exhaustive critical review of most of the various theories which have any claim to be based on accurate observation and scientific research, and the reader is referred to this review for further knowledge on this aspect of the disease. No direction is given in this article as to which theory to support; no one theory is satisfactory for all cases, and each has some basis for acceptance in individual cases.

PATHOLOGICAL CHANGES

Nothing will be said regarding the pathology of albuminuria of pregnancy, because little is known of it. So few women suffering from this complaint die, that opportunities for studying the underlying pathological condition are infrequent. Few women with the disease develop eclampsia, and eclampsia so frequently arises in women who have not had toxæmia in a demonstrable degree for any length of time, that to assume that the pathology of albuminuria of pregnancy is that of eclampsia in a lesser degree is merely speculation. The opportunity for investigation has arisen in those women known to be suffering from the disease who have met a violent death as a result of enemy action but it is not known whether any autopsies have been performed on a sufficiently large scale to justify conclusions. Since the pathology of the toxæmias of pregnancy is mostly obtained from studies of autopsies of patients dying of eclampsia, and eclampsia is rightly or wrongly accepted as the ultimate manifestation of cases of toxæmia, it has been generally accepted that some or all of the pathological signs of this disease are present in all cases of toxæmia. How far this is true is unknown, but a brief description must be given of some at any rate of the pathological changes found in eclampsia.

The *liver* surface is maculated by areas of subcapsular hæmorrhage, between which are normal, yellow or icteric smooth patches. These scattered areas of necrosis which pervade the liver microscopically display a lesion which is principally at the periphery of the lobules, and are classically surrounded by healthy liver lobules where there is no focal distribution of necrosis. Fibrinous thrombi and stasis are present in the portal capilliaries with hæmorrhage among the liver cells, which frequently display fatty degeneration.

The *kidneys* also show similar subcapsular hæmorrhages and swelling of the renal parenchyma. Formerly, it was thought that the almost universal degeneration of the convoluted tubules was the characteristic lesion, but the work of Bell and others has now shown that it is the glomerular changes which are more pathognomonic. The constant feature is the thickening of the capillary basement membrane, swelling of the endothelial cells and blockage of the capillary loops in each tuft, leading to ischæmia of the glomeruli and greater permeability, allowing albumin to escape. Sometimes the lesion is one of symmetrical cortical-necrosis.

In the *brain* there is generally cerebral anæmia, with frequently minute hæmorrhages and areas of softening, most marked in the cortex and basal ganglia.

The *heart* shows dilatation, with, microscopically, cloudy swelling and degeneration in the myocardial bundles.

The *lungs* are usually the site of catarrhal pneumonia with thrombi in the small vessels, and often petechial hæmorrhages, either subpleural or interlobar.

ALBUMINURIA OF PREGNANCY

The disease described under this heading occurs in some degree in about 3 per cent. of all pregnancies, more frequently in primigravidæ, and is relatively prevalent in twin pregnancy and cases associated with hydramnios. It is rarely, if ever, present before the child becomes viable, and usually makes its appearance during the last two months of pregnancy.

SIGNS AND SYMPTOMS.—The classical signs are a rise of blood pressure, with albuminuria and œdema. Not all these are necessarily present, and indeed in a few cases the disease, if it is the identical disease in a worse phase, becomes complicated by fits with any or all of these signs absent. The patient may feel quite well, but usually has lost her sense of well-being and complains of nausea, if not actual vomiting, headache, and either swelling or tightness of the hands and feet. Labour frequently supervenes early and arrests the course of the disease, the signs and symptoms of which usually have disappeared completely in a few weeks, although in some cases, particularly when continuing for many weeks, albuminuria may persist for months and hyperpiesis of a relative degree for years. As a rule, the condition arises in a hitherto perfectly healthy woman, and no residuum remains, but in about two-thirds of the cases it makes its appearance once again in a subsequent pregnancy by a display of one or other of the stigmata of toxæmia.

It is now generally recognized that some degree of *rise of blood pressure* above the patient's normal is the first warning that this disease is present. It is, however, unusual to know what was the standard blood pressure of the patient. No more unwarranted statement has made its appearance in the literature than that the patient's systolic blood pressure is equal to her age plus 100. The standard blood

pressure of most individuals is considerably lower than this, and in pregnancy it is lower than in the woman's non-pregnant state. An arbitrary standard of abnormality has gradually come to be accepted when the systolic reading is over 130 mm. and the diastolic over 80 mm. Hg, but no serious view should be taken of such readings, even when persistent, if no other signs or symptoms of abnormality arise. A reading of 140–150 mm. systolic and 80–90 mm. diastolic should be sufficient to keep a patient under observation in bed for a week or so and, even if persistent with no other sign, need not call for any special treatment or even for her remaining in bed unless it were known before that the patient's blood pressure had been considerably less than this. Far too many patients are condemned needlessly to spending weeks of their pregnancy in bed, and some even to induction of premature labour with still-birth or death of the neonate, by taking a too serious view of a moderate hyperpiesis which may be the individual's normal.

If this early rise of blood pressure represents a toxæmic state, sooner or later *œdema* and *albuminuria* will make their appearance. The œdema, at first confined to the feet and legs, and often only towards the end of the day, soon becomes more widespread, affecting the hands and face, vulva and abdominal wall, and is present even when at rest in bed. The albuminuria, from being a transient cloud increases in amount from less than 1 to as much as 20 or more parts per thousand and, whilst casts are not invariable, some granular, epithelial or hyaline casts are usually found and red blood corpuscles are not uncommon. Although an Esbach's reading has for long been accepted as some indication of the progress of the disease, it is of much greater value to have a more accurate daily or alternate day assay made of the degree of permeability of the kidney to albumin.

Ocular changes.—Other changes arising in this disease are in the fundus oculi, accompanied by referable symptoms, such as diplopia, dimness of vision, flashes of light and spots, and, in severe cases, blindness. The changes detected by the ophthalmoscope range from constriction of the arterioles and swelling of the disc, to retinitis with œdema, hæmorrhages, and necrosis.

At some stage in the disease it is not unusual for a rapid *rise in weight* of 6 or more pounds to occur in place of the average 3 to 4 pounds in a month, and this generally means fluid retention in the body and often a start of, or deterioration of, the toxæmic condition.

When the pregnancy is complicated by *anæmia*, albuminuria and transient œdema may make their appearance and lead to an incorrect diagnosis of toxæmia. This error must have been common in the past, and certainly still occurs far too frequently, particularly during the war years in which anæmia has become more prevalent in pregnant women. It is a wise policy to have a blood analysis made in all such cases, and indeed it is strongly advocated as a routine in all pregnant women. If this had been more regularly performed many grievous errors of treatment might have been obviated in treating cases of anæmia to their detriment by reducing an already deficient diet in a mistaken attempt to prevent a deterioration of a non-existent toxæmia, designated albuminuria of pregnancy.

CHRONIC NEPHRITIS AND HYPERTENSION.—Nothing has yet been said about those cases in which pregnancy occurs in women suffering from chronic nephritis or essential hypertension. Fortunately, the combination of the former

is uncommon, but when it does occur it is difficult to decide how much of the disease is caused by the pre-existing disease, and how much by a superimposed toxæmia of pregnancy. Should a toxæmic condition occur in these chronic sufferers then the clinical course of the disease will be much more serious and the permanent residuum of the underlying chronic disease will be greater. It has been suggested, and not without some justification, that the increase in the incidence of toxæmia of pregnancy to some extent arises from a renal damage inflicted in the earlier weeks of pregnancy by noxious drugs taken as abortifacients. Having failed in their prime motive, they may cause pathological lesions in the kidney and possibly the liver, which render these viscera more prone to the changes seen in toxæmia of pregnancy in the later months of the still progressing pregnancy, which would never have arisen but for the earlier damage. There is thus some resemblance, and indeed may be identity, in these different groups of chronic nephritics, hypertensives, and self-induced nephritics, when associated with pregnancy.

The *differential diagnosis* between chronic renal or vascular disease and albuminuria of pregnancy is not easy, and rests more securely on the preceding history than on laboratory tests of renal efficiency, although these latter must necessarily be also taken into account in arriving at a correct conclusion. Sometimes the final assessment cannot be made until the subsequent course of the physical signs is studied after the pregnancy has been over for months or even a year or two. The sudden onset of hypertension, œdema and albuminuria in a patient who has been known to be free of these in the earlier months of pregnancy is fairly conclusive evidence of the condition being a toxæmia of pregnancy, and the presence of these signs in the early months is fairly conclusive that there has been previous chronic renal or vascular disease. Arteriosclerosis and cardiac hypertrophy, especially when accompanied by retinal changes, rarely occur in toxæmic states, even when of long standing, and when, added to this, a high blood non-protein nitrogen and poor renal efficiency are present there is little doubt of the chronicity of the disease.

PRE-ECLAMPTIC TOXÆMIA

This term is reserved for those few cases in which eclampsia is imminent, either by a serious deterioration of the milder disease, described as albuminuria of pregnancy, or when occasionally the first manifestation of this toxæmia of pregnancy is the almost certain expectation of precipitate fits. Such cases usually occur in primigravidæ when there is massive œdema, of the hands and face in particular, and a marked degree of hyperpiesis or rapid rise of blood pressure. Headache, vomiting and epigastric pain arise from increasing intracranial pressure, cerebral œdema and liver damage, and twitching of the muscles draws attention to the reflex excitability of the central nervous system associated with the cerebral lesions necessary for the onset of fits.

ECLAMPSIA

It has generally been accepted that this is the culminating stage of albuminuria of pregnancy and pre-eclamptic toxæmia, but few cases of albuminuria of pregnancy ever develop convulsions, the essential sign of eclampsia. On the other hand, eclampsia may suddenly supervene in a case which has hitherto displayed none of the signs described under the heading of albuminuria of pregnancy. This serious

disease is fortunately not common, occurring in about 2 cases per 1000 births. It is more prevalent in one part of the country than another; it occurs at any season, but is encountered more often in cold weather, and particularly when there are sudden falls of temperature. Any or all of the signs of pre-eclamptic toxæmia may be present, and a good classification of the severity or otherwise of a specific case is that advocated by Eden, as Chairman of a Committee of the 1922 Obstetrical Congress of Great Britain. In this grading a case is said to be severe when any two of the following seven factors are present:—

(1) More than ten fits.
(2) A failure to regain consciousness between the fits.
(3) A temperature persistently over 100° F.
(4) A pulse persistently over 120 per minute.
(5) A systolic blood pressure persistently over 140 mm. Hg.
(6) No œdema.
(7) Anuria, or urine becoming solid on boiling.

The mean death rate was over 20 per cent., with over 30 per cent. in severe cases and 4 per cent. in cases not classed as severe.

Persistence of fits seems to be one of the most serious single signs, and with better methods of controlling them the mortality has been at least halved. The fœtal and neonatal death rate is still, however, over 60 per cent., even in those clinics practising that most undesirable of all methods of treatment, viz., Cæsarean section. Residual chronic hypertension is common, but recurrence of the disease is rare, although about 60 per cent. of cases of eclampsia display some evidence of toxæmia in a subsequent pregnancy.

TOXÆMIA ASSOCIATED WITH PLACENTAL HÆMORRHAGE

Although fatal cases of abruptio placentæ can occur with no other signs than those connected with the placental hæmorrhage so produced, yet the majority of such cases are accompanied by some or other of the signs associated with the toxic state. The popularly accepted belief that bleeding from the placenta accompanied by toxic signs occurs almost solely in the normally situated placenta, is not a fact, and whilst it is inevitable that the placenta situated in the lower uterine segment must bleed sooner or later, it is nevertheless found that some 30 per cent. of cases of placenta prævia are accompanied by some toxic signs, and it is contended that bleeding would have occurred from a proportion of these even had the placenta been normally situated. Such cases then, may be said to be abruptio placentæ or accidental hæmorrhage occurring in placenta prævia. Recurrence of placenta prævia is uncommon, yet, in about 20 per cent. of cases, one or other of the toxæmias occurs in a preceding or subsequent pregnancy to that in which the placenta prævia happened, and a careful analysis of such cases shows that this previous or recurrent toxæmia is almost entirely distributed amongst the individuals whose placenta prævia was complicated by toxic phenomena.

Young maintains that the toxic signs met with in cases of abruptio placentæ are the result of the placental necrosis set up by the retro-placental clot, rather than that the toxic condition causes a degeneration of the vascular endothelium and thus the production of the bleeding. He suggests that the retro-placental hæmorrhage and placental infarction are caused by an interference of the maternal

circulation by an upset of the prolan-progesterone harmony arising from an endocrine imbalance. Most observers, on the other hand, are agreed that there is little departure from the normal to be observed in the placentæ of most toxæmic patients. Owing to the wide divergence of opinion on this subject, which has recently attracted much attention because of certain resemblances to the "crush syndrome," it is impossible to make any definite pronouncement on the relationship existing between placental hæmorrhage and toxæmia.

ACUTE YELLOW ATROPHY OF THE LIVER

There is as little justification for including acute yellow atrophy of the liver in a description of the toxæmias of pregnancy as there is for hyperemesis gravidarum. There is little resemblance to the toxæmias in its clinical and chemical manifestations, and pathologically the liver changes bear only some resemblance to, and not identification with, the liver changes in certain toxæmic conditions. The condition known as acute yellow atrophy occurs in the non-pregnant state, especially as a result of certain poisons, such as chloroform, mercury and arsenic, and although fatty degeneration can affect the liver solely as the result of pregnancy and cause vomiting, epigastric pain, jaundice, coma and death, there is no liver necrosis, the etiology is unknown, and it is sufficient to refer to the condition briefly, and then to dismiss it from the category of toxæmias.

TREATMENT OF TOXÆMIA OF PREGNANCY

In considering the question of treatment of toxæmia in pregnancy, it must be kept in mind that, as there is probably no single cause for the group of diseases classed under this heading, there is no standard prophylaxis, and nothing is known that will bring about a cure so long as the pregnancy lasts. Some of the sequelæ, both immediate and remote, which can happen to mother and child, are, however, well known, so efforts should be directed towards their prevention. Albuminuria of pregnancy does not often give rise to the most serious of all the sequelæ, eclampsia, without passing first into the condition described as pre-eclamptic toxæmia, but it does, if allowed to operate too long, lead to permanent vascular and often renal damage, in addition to death of the fœtus *in utero*. Thus treatment should be guided by these considerations.

Constant and careful supervision is essential in all women presenting any of the signs of albuminuria of pregnancy, and as this involves careful analyses of the urine, and the strictest enforcement of rest as well as the extreme likelihood of induction of labour, it is better to treat these cases in an institution where the patient is relieved of the worry associated with an illness in her own home.

Rest in bed, by diminishing the metabolic processes in the body, relieves both kidney and liver, rests the heart, and is the most important single factor in treatment; in fact, in mild cases little else need be done, and too much stress cannot be placed upon this factor of treatment in the prevention of further ill-effects.

DIET.—In order to keep down the œdema, which is one of the factors apparently so necessary to the production of eclampsia, nothing has done so much good as the so-called *"water balance" diet*. Particular attention in this regime is paid to a balance being struck between the fluid intake and the urinary output:—

In one twenty-four hour period an estimate is made of the output of urine, one pint being added for each bowel evacuation. This is greater than the fluid content but the excess will

compensate for fluid lost by sweating. The total quantity calculated is the amount of fluid to be ingested in the subsequent twenty-four hour period, and so on during the time this treatment is being carried out.

As salt tends to cause retention of water, the diet should be largely *salt free*, by cooking without salt, and not taking it with meals. Much has been written regarding a *low protein diet*, but more deficiency states have resulted from this restriction than the good accruing from a liberal protein allowance in the diet, which will prevent the body calling on its own protein to supply its necessary calories. Elaborate protein-free diets have been drawn up and fail in their very purpose, because most of them are deficient in calorific value as well as in essential vitamin and inorganic salt content. To take iron as an example; a pregnant woman requires about 30 mgm. a day, and as anæmia is so prevalent in the toxæmic patient, and indeed may be her only pathological condition and mistaken for toxæmia, most of the low protein diets will aggravate the condition by their iron deficiency.

From the beginning of the treatment, and for the first twenty-four hours, an almost fluid diet is desirable, in order to have a standard on which to base the blood pressure and chemical analysis of the blood and urine. For the next day or two additions are made to this Stage I diet, but in three or four days the patient should be raised from this Stage II diet to one of Stage III, in which there are 2,500 calories and most articles of diet are allowed except red meats, which cause harm by their richness in meat extractives and purin bases. An illustration of the daily stage diets is given, but it is emphasized that too much attempt must not be made to following strictly this or any other of the many diets advised. A normal pregnant woman requires a diet of about 3,000 calories made up with about 80 gm. protein. 250 gm. carbohydrate, 100 gm. fat, 1,500 mgm. calcium, 1,900 mgm. phosphorus, 30 mgm. iron, and a rich vitamin content.

Stage I.—1,000 calories: Fruit drinks, if procurable, containing 8 oz. glucose, up to 4 to 5 pints of fluid a day.

Stage II.—2,500 calories: Fluids, sweetened with 4 oz. glucose, up to 4 pints, or as determined by the water balance regime.

Breakfast	..	Toast 2 oz., porridge 4 oz., milk 6 oz., sugar ½ oz., tea, butter ½ oz., marmalade ½ oz.
Lunch	..	Milk 4 oz., cocoa, sugar ¼ oz.
Dinner	..	Poached egg, or vegetable sandwiches 4 oz., potatoes 4 oz., milk pudding 4 oz., jam ½ oz., milk 5 oz.
Tea ..	..	Bread 2 oz., treacle (or jam) 1 oz., butter ½ oz., watercress or tomato, milk 2 oz., and sugar ¼ oz. in tea.
Supper	..	Milk 4 oz. and sugar ¼ oz. in cocoa—one or two biscuits.

Stage III.—2,500 calories.

Stage II plus ½ to 1 pint milk extra. Fish, veal, mutton, chicken or game up to 4 oz.

For how long the above treatment should be carried out depends largely on the severity of the condition, and on the chances of survival of the child if induction of labour is carried out. Little hope can be entertained of the disease undergoing complete cure so long as the pregnancy is allowed to continue, and if it is allowed to exist for more than a few weeks, permanent cardiovascular and indirect renal damage are almost bound to occur. As the disease is mainly one of the last two months of pregnancy there is generally the possibility of the child being born alive, if labour begins prematurely, either spontaneously or by induction. As the chances of the child's survival are, however, small before the last month, it is best to refrain from induction until this time, if the condition is not too advanced or

has not begun too early. The term "month" is used advisedly as introducing a proportionately smaller mathematical error than when pregnancy is reckoned, as is at present fashionable, in terms of weeks.

In all cases of pre-eclamptic toxæmia, labour should be promptly induced, and should rarely be delayed in any case longer than two or three weeks, and not at all when there is progressive deterioration with a patient under strict rest and supervision. In the occasional case when, in spite of the risks, it is decided to err on the side of delay or precipitancy, let the error be to delay. Of the choice of methods, rupture of the membranes is the quickest (short of Cæsarean section, which should be deprecated) but is fraught with greater risk to the infant than slower methods, such as bougie introduction.

TREATMENT OF ECLAMPSIA

Should eclampsia develop in a case of toxæmia or the disease be first proclaimed by a convulsion, then all treatment should be directed to the control and prevention of further fits. The patient should be nursed in a warm room, and sudden visual, auditory, and tactile stimuli kept to a minimum. The room should not be dark; there should be a sufficiency of light to observe the patient and give the treatment.

Morphine, assisted by the synergistic action of magnesium sulphate, is proving to be the best method of controlling fits and some modification of the following scheme will go far to this attainment:—

Zero hour: Hypodermic injection of morphine, ¼ grain.
0.30 hour: Subcutaneous injection of 40 c.cm. of 15 per cent. magnesium sulphate i.e. 6 gm.
2.00 hour: Hypodermic injection of morphine, ¼ grain.
5.30 hour: Hypodermic injection of magnesium sulphate, 6 gm., if fits have recurred, 4 gm. if no further fits.
11.30 hour: Hypodermic injection of magnesium sulphate, 3 gm.
19.30 hour: Hypodermic injection of magnesium sulphate, 3 gm.

Light chloroform anæsthesia should be used for most manipulations, including the giving of the magnesium sulphate, unless the patient is profoundly comatose. Should signs of magnesium sulphate poisoning appear, such as acute cyanosis, feeble pulse, or laboured breathing, 10 c.cm. of 5 per cent. calcium chloride solution should immediately be given intravenously. Labour should be induced if it has not already begun forty-eight hours after the last fit.

The detailed treatment of cases of toxæmia associated with placental hæmorrhage is beyond the scope of this article, but in principle it is a combination of the appropriate treatment of the hæmorrhagic state, supplemented by such treatment of the toxæmic state as has been already described.

CONCLUSION

In view of the limited scope of this article, no attempt has been made to write an historical review of the gradually increasing knowledge of the widespread disease called toxæmia of pregnancy. Again, in such a short review of the modern views and treatment little more can be done than to select the more factual, rather than the theoretical, and present them in a somewhat necessarily dogmatic manner. No attempt has been made to introduce a bibliography, which can be easily obtained from more exhaustive treatises.

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DIAGNOSIS AND TREATMENT OF HÆMORRHAGE IN LATE PREGNANCY

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THE commonest and most important source of hæmorrhage in late pregnancy is from the placental site; such hæmorrhage is known as ante-partum hæmorrhage and is defined as bleeding from the placental site between the twenty-eighth week of pregnancy and the birth of the child.

The first step in the diagnosis is to make sure that the bleeding is actually coming from the uterus. It is possible for the patient to lose blood from the rectum, or to have hæmaturia and still be under the impression that the bleeding comes from the vagina. If any suspicion exists that the bleeding does not come from the vagina, a rectal examination together with examination of the stools should exclude a rectal source of bleeding, just as a catheter specimen of urine can exclude hæmaturia. Even though it has been established that the bleeding comes from the vagina, certain local conditions may be responsible for slight hæmorrhage and should be excluded before concluding that the bleeding comes actually from the uterus.

In late pregnancy all aseptic precautions should be used for this examination. The gloves and instruments should be sterilized and dettol used as an antiseptic. The cervix and vaginal walls should be felt by the examining finger and also viewed if possible through a speculum. The most likely sources of bleeding from the cervix are either a polypus or a vascular erosion; these common causes, together with rare causes, such as carcinoma of the cervix, can be excluded by inspection of the cervix. The vaginal walls are unlikely to be the source of the bleeding, but it may be that the patient has been wearing a pessary or has a small varicose vein in the vaginal wall which has ruptured.

Having made sure that the bleeding is from the vagina, and having excluded the few cases in which the slight bleeding is due to local conditions in the cervix or vaginal wall, it must be inferred, even though the blood is not actually seen coming through the cervix, that the bleeding comes from the uterus. Unless this bleeding is the first sign of the onset of labour, a "show" preceding the onset of pains, the diagnosis is one of ante-partum hæmorrhage. It should be stressed again that this is by far the commonest and most important cause of bleeding in late pregnancy, whether the bleeding be slight or severe.

ANTE-PARTUM HÆMORRHAGE

If the bleeding comes from a placenta in the upper segment it is known as accidental hæmorrhage. When the placenta is wholly or in part in the lower segment the bleeding is known as placenta prævia or unavoidable hæmorrhage. A brief reference to the classification and etiology of these two types of hæmorrhage is essential before a discussion of the diagnosis and treatment.

ACCIDENTAL HÆMORRHAGE.—Such bleeding is usually *revealed accidental hæmorrhage,* in which vaginal hæmorrhage occurs whilst some of the blood is retained in the uterus behind the placenta or membranes or even in the amniotic cavity.

Concealed accidental hæmorrhage in its severe form is a rare and serious complication of labour. Here the blood from the separated placenta is retained within the uterus.

PLACENTA PRÆVIA.—Three types are described, a rough estimate of their relative incidence being given in brackets after each:—

Central placenta prævia (5 per cent.) in which the placenta completely covers the internal os at the beginning of labour.

Marginal placenta prævia (15 per cent.): the edge of the placenta crosses the internal os at the beginning of labour.

Lateral placenta prævia (80 per cent.): the lower part of the placenta is attached to the lower uterine segment, but does not encroach on the internal os.

Should a lateral placenta prævia have a velamentous insertion of the cord, and should the vessels in the membranes cross the lower segment beneath the presenting part, the condition is known as *vasa prævia.*

The etiology of placenta prævia is not known.

DIAGNOSIS

When ante-partum bleeding occurs, it is important to discover the situation of the placenta. In other words, is it a case of placenta prævia or accidental hæmorrhage?

History.—It occasionally happens that placenta prævia recurs with subsequent pregnancies, but a record of the patient's past obstetric history seldom throws any light on the diagnosis. A fall or accident preceding the hæmorrhage is suggestive of accidental bleeding. Signs and symptoms of toxæmia again make accidental hæmorrhage the probable diagnosis.

The actual history of the bleeding itself may suggest the correct diagnosis. For, whereas placenta prævia hæmorrhage is painless, often starts at night while the patient is asleep and tends to recur and increase, accidental hæmorrhage is sudden in onset, accompanied by abdominal pain, usually occurs by day and tends to be brisk at the outset and then stop. From these few points it is clear that the history can be no more than suggestive of the diagnosis.

EXAMINATION.—*General.*—The blood pressure should be taken and the urine tested for albumin to exclude toxæmia. Other signs of toxæmia, such as œdema of the ankles, should be noted.

Abdominal.—The presentation of the fœtus and relation of the presenting part to the pelvic brim should be ascertained. An engaged head is suggestive of a normally situated placenta, in other words of accidental hæmorrhage. Placenta prævia prevents engagement of the presenting part and may cause a transverse lie or breech presentation. If the vertex is presenting with placenta prævia, the head will be high and cannot be made to engage in the pelvic brim. The actual sensation produced in attempting this manœuvre differs in placenta prævia and contracted pelvis, for whereas in the latter the head "bites" the brim, attempts to press the head on to placenta prævia give no such sensation. Tenderness on abdominal

examination suggests accidental hæmorrhage with some retained blood. The fœt heart is generally audible in placenta prævia but may be absent in accident hæmorrhage, if there is extensive separation of the placenta.

Vaginal.—This is the only sure way to diagnose placenta prævia. As tl examination may start bleeding it should never be undertaken until the patie is in surroundings where everything is available to stop hæmorrhage, which m: on occasions be severe.

Before labour the cervix in a primipara will be closed and will not admit the tip of tl examining finger. Active dilatation of the cervix with uterine dilators is not recommended such circumstances. The only clinical information to be obtained by vaginal examinati when the cervix is closed is to ballot the presenting part through the fornices. If the placen is in the upper segment, the presenting part will be clearly felt through the lower segmer With a placenta prævia, however, the impression of a "boggy mass" between the examinir finger and presenting part is obtained.

A slight hæmorrhage associated with a high presenting part and closed cervix will oft prevent a diagnosis of the situation of the placenta being made. In such cases, when tl patient is near term, an X-ray photograph may help. If the placenta is normally situat in the upper segment the placental shadow can be made out in a good plate. If the placen is prævia it may not be possible to see the placental shadow, but its presence in the low segment may be inferred by the absence of its shadow from the upper segment. Anoth X-ray method of demonstrating the placental site is that of photographing the fœtus aft the injection of a radio-opaque solution into the bladder. Interpretation of the result wi this technique is more liable to fallacy than in the case of a straight X-ray.

During labour, or with a multiparous dilatation of the cervix before the onset of labou it is possible with or without an anæsthetic to insert a finger through the cervical canal ar explore the lower uterine segment for some distance around the internal os. With accident hæmorrhage the presenting part can easily be felt, although a certain amount of friable bloc clot may lie in front of it. Placenta prævia is diagnosed with certainty, both as regards i presence and type, by actually feeling the placenta through the internal os. Placental tissi with its tough and spongy consistence has to be distinguished from blood clot which is sc and friable. Again it must be emphasized that this examination may start severe bleedir and should never be undertaken until the obstetrician has full facilities available for stoppir the bleeding.

DIAGNOSIS OF CONCEALED ACCIDENTAL HÆMORRHAGE.—The clir ical picture of severe concealed accidental hæmorrhage is in a different class fro other types of ante-partum hæmorrhage associated with vaginal bleeding. In tl first place there is no vaginal bleeding in the acute stage. The patient is sudden seized and collapsed by acute abdominal pain. Signs of loss of blood, such as a hunger, sighing respiration and restlessness, soon appear. The patient is ashen gre with a thready rapid pulse and subnormal temperature. The uterus is acutely tend with a hard consistency which has been described as "woody." No fœtal parts ca be felt and no fœtal heart heard. Owing to the atonic and toxic state of the uterir muscle, the uterus may passively enlarge with increase of the concealed hæmo: rhage within it. Skin pencil marks on the abdominal wall should be used to chec any increase in the height of the fundus. Signs of toxæmia of pregnancy, such : œdema of the ankles, severe albuminuria and hypertension, are always present wit concealed hæmorrhage; such signs should readily distinguish this condition fro other acute abdominal emergencies.

Vaginal examination in concealed hæmorrhage reveals no special signs, the low segment feels tense as also will the bag of membranes, should the cervix b sufficiently dilated to enable them to be felt.

TREATMENT

nte-partum hæmorrhage may be one of the most serious complications of ·egnancy, and it is impossible to predict at the onset whether the bleeding will :come severe or not. It may also be impossible in the first instance, if the cervix closed, to decide whether the hæmorrhage is due to accidental hæmorrhage or acenta prævia. Hæmorrhage in late pregnancy is one of the danger signs in)stetrics. However slight, it should never be ignored. It is a symptom which :quires immediate and expert supervision. From what has been said it is clear that ιe early removal of the patient to hospital after the first warning hæmorrhage is ιe safest course. Examination of the patient, which may start fresh bleeding, ιould be deferred until after admission to hospital, where blood of a compatible BO group, preferably Rh-negative, should be readily available.

ACCIDENTAL HÆMORRHAGE.—Slight hæmorrhage may be treated ex- ectantly by rest in bed, and the administration of sedatives: morphine in the first ιstance, followed by bromides when the initial bleeding has subsided. Especially following external version or a fall the bleeding may cease. In a few days the atient should be allowed up, after which she may often proceed to term without ιrther worry.

Severe bleeding or poor general condition of the patient, possibly resulting from he associated "toxæmia," indicates interference to initiate or expedite labour.

(a) If labour has not begun, the patient should be anæsthetized, the membranes hould be ruptured and the vagina plugged, as follows :—

Rolls of gauze four inches wide and six yards long are used; these should be soaked in per cent. dettol solution; in a multiparous patient it may be necessary to use several rolls, ˅hich should be tied together. The patient should be catheterized, and the gauze firmly ɲd methodically packed into the fornices with sponge forceps with the help of a finger. ˅hen the vagina has been tightly packed a firm abdominal binder and T-shaped bandage hould be applied.

This treatment prevents further bleeding, and the rupture of the membranes ;hould induce labour. The plugging should remain in the vagina until the second ;tage of labour, when it will be pushed out in front of the presenting part. If labour ιas not begun twenty-four hours after plugging the vagina the gauze should be :emoved, and the decision to re-plug or to treat expectantly depends on whether :he bleeding continues or not.

(b) If labour has started, artificial rupture of the membranes will increase the force of uterine contractions. If hæmorrhage persists, either the vagina may be plugged as described, or it may be sufficient to give small doses of pituitary extract (¼ c.cm.) at half-hourly intervals.

Concealed accidental hæmorrhage.—The immediate concern is the treatment of shock and replacement of blood. Warmth, morphine and blood transfusion are the first essentials. The membranes should not be ruptured until the uterus shows signs of regaining its tone, otherwise further bleeding will occur from the atonic uterus. These measures should improve the patient's general condition, with a slowing of the pulse rate and a rise of temperature. In a favourable case the onset of uterine contractions will be accompanied by vaginal bleeding, showing that the uterine tone is returning: this is the moment to rupture the membranes, after

which labour usually terminates quickly. Blood transfusion is essential and may have to be maintained until after the patient is safely delivered. Should the patient show no signs of recovering from the shock her only chance probably lies in a quick Cæsarean section, which may entail removal of the uterus if it fails to contract after removal of the baby and placenta.

PLACENTA PRÆVIA.—It should be emphasized again that it is unwise to attempt to treat placenta prævia at home if hospital accommodation is available. It is also risky to temporize unless the danger of this course is fully understood. The type of case which occasionally warrants an expectant attitude is the patient who, although not in labour, has had a small warning hæmorrhage and is diagnosed as placenta prævia. She may be only thirty-two weeks' pregnant with a baby too premature to survive. Cæsarean section is contemplated in her case when the child is bigger. Such a patient should always be rested in hospital for a week or more while the baby is growing. Immediate Cæsarean section or alternative treatment can then be carried out if further bleeding occurs. With this one exception—which is one which would not be accepted by all obstetricians—it is fundamental to institute treatment with the mother's life as the foremost consideration.

Whatever method is used to arrest hæmorrhage from placenta prævia, vaginal delivery entails considerable risk to the fœtus, the still-birth rate varying between 40 and 80 per cent., according to the type of placenta prævia and the method used to control bleeding. Under the best conditions the maternal mortality should be considerably under 5 per cent.

Immediately after admission to hospital the following facts should be available, if necessary after examination under anæsthesia:—

(1) Age of patient and parity.
(2) Presentation of fœtus.
(3) Has labour begun ?
(4) Amount of cervical dilatation.
(5) Type of placenta prævia.
(6) Condition of the patient.
(7) Facilities available.

Cæsarean section has many advantages if expert surgical help is available and the patient is in good condition. The operation should never be performed after plugging the vagina or after severe bleeding. The ideal case would be an elderly primipara not in labour, with a good-sized fœtus, who has a central placenta prævia, although sometimes one or all of these three conditions may be absent and Cæsarean section still be the best method of delivery.

Excluding those few cases in which expectant treatment is justifiable, and the larger number in which Cæsarean section is decided upon when the patient is first seen, the principles underlying the treatment of placenta prævia are:—

(1) *Arrest of bleeding.*—This is the first duty and there are several alternative methods, each entailing compression of the placental site by the presenting part. The simplest and often the sole procedure necessary is artificial rupture of the membranes and the application of an abdominal binder. Plugging the vagina as described under accidental hæmorrhage is a sure way of arresting severe bleeding, and if preceded by artificial rupture of the membranes should induce labour, which

a great advantage. Bipolar version and the control of bleeding by the half breech always an alternative, which can be carried out in any surroundings, provided e cervix is at least two fingers dilated.

It is obvious that there is no single method of treating placenta prævia or even arresting the bleeding. The following table suggests possible lines of treatment ice the facts of the case have been ascertained:—

		1 Multip. or primip. age	2 In labour or not	3 Type of placenta prævia	4 Presentation of fœtus	5 Dilatation of os	6 Condition of patient	7 Facilities available
A	Artificial rupture of membranes and binder	Multip. or primip.	Yes	Lateral	Vertex	Three fingers or more	Good	None necessary
B	Artificial rupture of membranes and Willet's scalp forceps	Same circumstances as above, but bleeding persists after artificial rupture of the membranes						
C	Artificial rupture of membranes, vaginal plugging, T-bandage and binder	Multip.	Not	Central or marginal	Vertex	One finger or more	Poor	Few necessary
D	Bipolar version or bringing down leg of a breech	Multip.	Yes	Marginal	Breech	Two fingers or more	Fair	None necessary
E	Cæsarean section	Primip. 40	Not	Central	Immaterial	Closed	Good	Surgical facilities

(2) *Treatment of shock.*—Having arrested the bleeding the next duty is to replace he blood lost. All cases of placenta prævia should be blood grouped on admission o hospital. The free use of blood transfusion is an essential part of treatment, lot only to replace blood already lost, but also to anticipate further loss during abour, especially in the third stage. Intravenous and rectal salines are useful lternatives to blood. Warmth and morphine also play their part in restoring the patient.

(3) *Delivery of the patient.*—It is essential that the actual delivery should not in any way be hastened until shock is overcome. During delivery the use of forceps should be avoided if possible, owing to the vascular lower segment placental site. For the same reason post-partum hæmorrhage must be watched for and manual removal of the placenta carried out early, if other means of controlling bleeding do not quickly succeed. A small loss in the third stage may prove fatal in a patient already suffering from shock and blood loss.

THE CARE OF THE PREMATURE BABY

WITH SPECIAL REFERENCE TO THE BABY BORN IN ITS OWN HOME

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IN the City of Birmingham during 1943, no less than 27·8 per cent. of infants weighing 5½ lb. or less at birth (i.e., premature babies) died before reaching the age of one month, whilst the corresponding figure for infants over 5½ lb. was only 1·1 per cent. This high neonatal mortality rate can be considerably reduced if adequate facilities are available for the care of the premature baby. For instance, in a series of 827 premature infants born at the Birmingham City Maternity Home (Sorrento) the neonatal mortality was 12·8 per cent.; and neonatal mortality rates of 8·1 to 9·5 per cent. have been reported by other workers on smaller numbers of cases (Field, 1943; Barnes and Wilson, 1942; Lamb, 1939).

Facilities for the care of the premature infant must be available during and immediately after the birth, as well as subsequently.

CARE DURING BIRTH

The chief risks to a premature baby during birth are:—
    (1) Intracranial birth injury.
    (2) Asphyxia.
    (3) Infection.
    (4) Loss of body heat.

Intracranial birth injury is least likely to occur with a spontaneous vertex delivery aided, if necessary, by an adequate episiotomy. If the second stage is delayed, a carefully performed forceps extraction adds little risk to the infant. High forceps and breech extraction should be avoided, as they carry high fœtal risks, and attempts to hasten delivery by the use of uterine stimulants are inadvisable. Vitamin K should be used to ensure a high level of prothrombin in the child; 20 mgm. of synthetic vitamin K being given to the mother, not less than two, or more than twelve, hours before delivery.

The administration of anæsthetics and sedatives which depress the respiratory centre should be avoided, as they lead to *asphyxia* of the infant; chloral and bromides may, however, be safely used. Modern facilities for the treatment of asphyxia should be available.

To avoid *infection*, the labour must be conducted with all the usual aseptic precautions. Persons suffering from infections must be excluded from the labour room, and attendants must wear gowns and masks, and wash their hands before handling the child. The infant should be received into a sterile or clean towel, then wrapped in a newly washed blanket.

Loss of body heat is reduced by maintaining the temperature of the labour room at 80° F., wrapping the infant in a towel and blanket as soon as it is born, and transferring it to a warm cot after the cord has been divided.

CARE IMMEDIATELY AFTER BIRTH

Unless the home is a good one, and a specially trained nurse or midwife is available (day and night), the chances of survival are greater in an institution which specializes in the care of the premature baby, particularly if (1) the birth weight is less than $4\frac{1}{2}$ lb., (2) the colour is poor or cyanotic attacks are occurring, or (3) the infant is unable to suck a bottle.

If the infant is to be transferred, this should be done as soon as possible and arrangements must be made for suitable transport. Meanwhile, the infant should be left undisturbed in its cot; it should not be bathed, dressed or fed, before its journey.

SUBSEQUENT CARE IN THE CHILD'S OWN HOME

The following are the main principles in the care of the premature baby:—

(1) Maintenance of the body heat.
(2) Maintenance of respiration.
(3) Protection from infection.
(4) Careful feeding.
(5) Early recognition and treatment of the complications to which a premature baby is prone.

MAINTENANCE OF BODY HEAT.—Unless artificial heat is supplied, the temperature of a premature baby gradually falls; but care must be taken to control the amount of heat supplied, as the baby's heat-regulating centre is poorly developed and overheating can easily occur. Experience has proved that an infant thrives normally if its rectal temperature becomes stabilized between 96° and 98° F.; the smaller babies tend to stabilize at 96°, but as they gain in weight and improve in general condition, the level of stabilization gradually rises to 98° F. A low-reading thermometer is necessary, and the temperature is usually taken in the rectum, but twice daily only, if there is a reasonable degree of stabilization.

(a) *The room.*—An even temperature must be maintained, and 70° F. appears to be the optimum temperature for infants weighing less than $4\frac{1}{2}$ lb. Larger infants only require this temperature for the first few days, then do better in a cooler room. The room can be heated by any type of fire, but it is difficult to maintain an even temperature with a coal fire. In cold weather it is advisable to increase the relative humidity of the heated air by placing a kettle or pan of water on the fire or on a gas or electric ring, or by hanging a wet sheet in front of the fire.

Ventilation should be draughtless and continual. A screen should be placed around the cot, in order to protect it from draughts when the door is opened, and the cot should never be placed in a direct line between the door and window.

(b) *The cot.*—If a treasure cot is not available, a suitable draught-proof cot can be improvised by using a washing basket, wooden box, or even a drawer from a chest of drawers, if it is suitably lined. The lining must be washable and should be provided with pockets for hot-water bottles (one either side and one at the foot). The mattress must be firm. A pillow is not required. Hot-water bottles should be sufficient to heat the cot and, in order to keep the temperature as uniform as possible, they must be refilled hourly, in rotation. Each bottle should be completely covered with a flannel bag, in addition to being placed in the pocket, to avoid the danger of bottle burns.

Electric pads have been recommended by the Ministry of Health (Circular 2c but in my opinion these may be dangerous in inexperienced hands, because c possible risks of cross-infection, electric shock and overheating.

All infants in heated cots should be provided with a thermometer (wall t which is placed between the blankets immediately on top of the child. general rule, the smallest infants require a cot temperature of 90° to 95° F.; as the level of stabilization of the body temperature rises, the temperature o cot can be gradually reduced.

(c) *Clothing.*—Clothing should cover the baby completely (with the exce; of the face), be of such a design that it can be easily changed, be made of a conducting material, in order to conserve body heat, and be washable. Flan: the ideal material and the variety called "union flannel" contains just enough c to prevent shrinkage. In emergencies, gamgee may be employed as a temp: measure, but ordinary cotton-wool should never be used, as it sticks to the and gets into the infant's mouth and air passages.

A suitable set of clothing for the smallest infants consists of:—

(1) A flannel vest, open but overlapping in front, with tape fastenings the shoulders.

(2) A sleeveless flannel gown, open down the front with plenty of ove and provided with a hood.

(3) A soft napkin.

(4) An absorbent bib.

If the infant is active, sleeves should be provided, and when a weight of a 4½ lb. is reached the hood is not required.

(d) *Nursing procedures.*—These should be performed with the minimur exposure, if heat loss is to be prevented.

Weighing: All infants should be weighed in a blanket, and the smaller on: their clothing (before it is changed). Healthy infants need not be weighed 1 often than twice a week.

Bathing or oiling: After birth, the vernix may be gently removed with steri! (olive or nut) on sterile swabs, before the infant is dressed, but if the infant i: feeble the vernix should be left to drop off gradually. As the general cond improves, the oiling can be more thorough, and at a weight of about 4½ lb. v baths can be started. At this stage the infant can usually be lifted out of the and bathed on the knee, in a warm room, in front of a fire and screened : draughts.

MAINTENANCE OF RESPIRATION.—The more premature the baby, more carefully must it be handled. It should be placed on its side and nevei on its back, because of the danger of regurgitation and aspiration; and it mus turned gently from side-to-side at regular intervals to allow both lungs to ex} equally. All nursing procedures must be performed with the utmost gentle until the infant is strong enough to allow of handling without regurgitatio change of colour. The smaller infants should be fed, changed, dressed and ¢ in the cot, and great care must be taken during removal for weighing. necessary handling must take place before, and not after, feeds.

If continuous cyanosis be present, oxygen should be given (it can be simply

successfully administered by means of a small rubber mask placed over the face); and if a cyanotic attack develops, the air passages must be cleared and respiration re-established with the minimum of exposure and handling. The head may be lowered and the air passages cleared with a boiled rubber catheter, and 7 per cent. CO_2 in oxygen administered. If this fails, the infant may be gently "rocked" (end to end), but more violent forms of artificial respiration do more harm than good. To prevent recurrence, the cause (atelectasis, general inanition, intracranial birth injury, infection, congenital malformations, or errors of feeding and general management) must be found and treated. Infants with respiratory difficulties should be removed to hospital, unless skilled nursing is available day and night.

PROTECTION FROM INFECTION.—As few people as possible should enter the room and persons with any form of infection must be excluded.

Dry dusting and sweeping should not be allowed: dusters should be used damp, floors washed, and carpets vacuum-cleaned, or sprinkled with damp sawdust or tea leaves before being swept.

Attendants should wear gowns and masks and wash their hands before handling the child. The infant must be fed with breast milk whenever possible and scrupulous care taken in the preparation, storage and administration of feeds.

CAREFUL MANAGEMENT OF THE FEEDING.—Certain difficulties are met with in the feeding of premature babies. For instance, the power of suction is weak or absent; the swallowing reflex may also be absent in the smallest babies; and special methods of feeding (pipette and tube feeding) are required to overcome these difficulties. Again the cardiac sphincter is poorly developed and regurgitation may occur; the regurgitated food, owing to the absence of the cough reflex, may be inhaled. Large feeds should therefore be avoided, and the infant handled as little as possible after feeds. The more premature the baby, the weaker is the power of digestion, especially in regard to fats, and unless weak feeds are given, digestive upsets will occur. Abdominal distension may also occur and give rise to cyanosis.

(a) *Methods of giving feeds.*—Generally speaking, if the infant can suck it is put to the breast (if strong enough) or given a bottle; if it cannot suck but can swallow, it is fed by pipette; whilst if it can neither suck nor swallow, tube feeds are given.

In all methods of feeding, the head is raised in order to reduce the danger of regurgitation: the infant is placed on its right side, as this allows the stomach to empty more rapidly and avoids pressure on the heart by the dilated stomach.

The boat-shaped bottle is useful for infants with poor powers of suction, as the formation of a vacuum can be avoided by removing the valve and controlling the flow by the use of a clean finger on the open end.

Œsophageal tube feeds are more successful than stomach feeds, as they are less likely to cause vomiting and distension of the stomach with air.

A Jaques catheter no. 4 is used, with a small pipette (fountain-pen filler, without the rubber bulb) attached to the upper end of the catheter, as this allows easy observation of the rate of flow of the feed. The infant is measured from the bridge of the nose to the tip of the ensiform cartilage, and this distance is marked off on the catheter (from the tip) with sewing cotton, as this does not boil off. The head of the cot is raised and the infant placed on its right side. The dry boiled catheter is introduced through the mouth (the nasal passages are too narrow and easily injured and infected) and pushed down the œsophagus until the cotton mark is on a level with the gums (there need be no fear of the tube entering the air passages). The tube is pinched and the feed poured in; the tube is then released.

and the feed allowed to flow slowly, the pipette being refilled before it becomes empty, so as to avoid the introduction of air. When the whole feed has been given, the tube should be firmly pinched and gently extracted.

The danger of œsophageal feeding is the risk of overflow into the air passages, but this can be avoided if the head is well raised, the feed given sufficiently slowly, and care taken to ensure that the catheter is empty during introduction and extraction.

Tube feeding can be used for (1) feeding small infants who can neither suck nor swallow, or who become cyanosed when fed by pipette; (2) feeding sick premature infants, e.g., cases of pneumonia or intracranial birth injury; (3) giving occasional extra feeds to infants unable to take sufficient for their needs, by bottle or pipette. Tube feeding is, however, not entirely free from danger and should never be used as a means of saving time or trouble. A tube feed should never be given by an untrained attendant.

(b) *Fluid and calorie requirements.*—Both overfeeding and underfeeding must be avoided, but it is safe to say that infants should be taking 1 ounce per pound (birth weight) daily by the third day of life, 2 ounces per pound by the seventh day and 3 ounces per pound by the end of the second week.

Premature infants eventually require an average of 50 to 60 calories per pound daily, but these values should only be reached by the end of the second week of life. There is a great tendency to overfeed premature babies during the first week of life, and this must be avoided because digestive upsets readily occur and may prove fatal. Avoidance of overfeeding at this stage is particularly important when dealing with an artificially fed infant. The problem of the premature baby, during the first few weeks of life, is one of survival, not of nutrition.

(c) *Size and frequency of feeds.*—Feeds should not be given for at least twelve hours after birth, because the incoordination of the swallowing reflex persists for some hours and there is a risk of inhalation. After twelve to twenty-four hours, routine feeding can be started. In the case of infants fed by bottle or pipette, small frequent feeds are given, the frequency depending on the quantity that the infant can suck before it tires; and the interval between feeds is gradually increased, as the infant becomes stronger and able to take larger feeds. If tube feeding is necessary, larger amounts are given at four- to six-hourly intervals. The largest feed which can be given safely by tube is approximately half an ounce per pound birth weight, but if undue distension, cyanosis or vomiting occurs, a smaller feed must be given more frequently. However small the infant, the stomach should be allowed a rest period during the night, from midnight to 4 or 6 a.m.

(d) *Breast feeding.*—Breast milk should be given, whenever possible, because of the weak digestive power of the premature child.

Infants weighing over 5 lb. at birth may be put to the breast, at regular intervals, after the first twelve hours of life. Those weighing from 4½ to 5 lb. and in good condition, can begin breast feeding on the fourth or fifth day of life, and until then should be fed by bottle with expressed colostrum or diluted breast milk. These smaller infants should be put to the breast once or twice daily to begin with, and the daily number of breast feeds gradually increased, as the condition of the

infant improves. Each feed should take the form of a "test feed," and deficiencies in quantity made up with expressed milk, after the infant has been returned to its cot. If all efforts fail to maintain the mother's own supply of milk, attempts should be made to obtain a supply from another mother, or a "breast milk bank." Milk obtained from other mothers must be pasteurized or boiled before use.

(e) *Artificial feeding*.—This should be resorted to only if breast milk is unobtainable. No modification of cow's milk has yet been produced, which is as digestible as breast milk, the main difficulties being in relation to the fat and protein.

Few premature babies can digest more than 1·5 to 2·0 per cent. fat in an artificial feed; therefore a feed must have a low fat content. The protein can be made more digestible by boiling, dilution with water, peptonization or acidification (addition of lactic acid); the protein in dried and condensed milks is also more digestible, since the process of drying or condensing milk results in a smaller and softer curd. If the curd is modified in one of these ways it is usually possible to increase the protein gradually to approximately 2 per cent. by the age of two weeks. In order to maintain the balance between the protein on one hand and the sugar and fat on the other, an increased amount of sugar is advisable, and it has been found that cane or beet sugars are tolerated in the highest percentages (8 to 10 per cent.).

Any one of the following modifications of cow's milk will be found useful in the feeding of the premature baby:—

Food	Dilutions used
(1) Sweetened condensed milk	1 in 16 to 1 in 6
(2) Unsweetened condensed milk with the addition of 1 level teaspoon of sugar to every 3 ounces of mixture ..	1 in 12 to 1 in 4
(3) Full-cream dried milks with the addition of 1 level teaspoon of sugar to every 2 ounces of mixture	1 in.32 to 1 in 12
(4) Peptonized or lactified cow's milk with 1 level teaspoon of sugar to 2 ounces of mixture	1 in 4 to 1 in 2

The weaker dilutions are given to the smaller babies during the first few days of life; the stronger dilutions are intended for the larger and older babies.

As a general rule, "half-cream" dried milks contain too low a fat content for healthy premature babies, when diluted sufficiently to reduce the protein to suitable levels, and most "humanized milks" have too high a fat content for use during the early weeks of life.

(f) *Vitamins*.—Extra vitamins must be given to all premature babies, however they are fed, because their requirements are so great.

Vitamins A and D may be begun at the end of the first week of life, a concentrate being used, as large doses of cod-liver oil are not well tolerated. A small daily dose is gradually increased until, at the age of three to four weeks, the infant is receiving at least 3,000 I.U. of vitamin D daily, in addition to the associated vitamin A.

Vitamin B: Little is known about the requirements of a premature baby for the various factors of the vitamin B complex.

Vitamin C may be given in a concentrated form, as the requirements are great. A dose of 5 mgm. of ascorbic acid (celin or redoxon) may be begun on the third day of life, and increased daily by 5 mgm. until, at the age of twelve days, 50 mgm. is being given. Orange juice may be added in small quantities at the age of four weeks, or weight of 4½ lb., and as the daily dose of orange juice is increased the dose of the synthetic preparation should be reduced.

Vitamin K: In order to prevent the marked and prolonged hypoprothrombin æmia which occurs in premature infants, 0·5 to 1·0 mgm. of water-solubl synthetic vitamin K (e.g. synkavit: Roche) may be given six to twelve hour after birth, orally or by injection.

(g) *Mineral salts.*—Sufficient mineral salts must be given to the premature baby because of its defective store at birth, and relatively greater needs after birth It is advisable to give calcium and phosphorus from the end of the second wee of life, a suitable preparation being syrup of calcium lacto-phosphate, given in dosage of one minim per pound body weight, daily. As regards iron, it is unlikel that any useful purpose is served if iron is administered before the age of six t eight weeks (Josephs, 1934).

COMPLICATIONS LIABLE TO OCCUR

Any disorder of early life may occur in the premature infant, but because of th physical defects associated with prematurity, certain complications occur more frequently than in the full-term infant. The following table sets out the chie physical defects, and the complications to which they may give rise:—

Physical defect	Complication
(1) Defective respiration	Atelectasis and cyanosis
(2) Poor control of body temperature	High or low temperature
(3) Diminished alimentary tolerance	Gastro-intestinal disorders
(4) Increased capillary fragility	Hæmorrhages
(5) Deficient calcification of skull	Intracranial birth injury
(6) Poor renal function	Oedema
(7) Inadequate antenatal storage of mineral salts and vitamins	Anæmia and rickets
(8) Hepatic immaturity : Bilirubinæmia	Jaundice
Hypoproteinæmia	? Oedema
Hypoprothrombinæmia	Hæmorrhagic disease
(9) Increased body water content	Dehydration liable to occur

SUMMARY

In the case of the larger infants there is no doubt that good results can be obtaine in the child's own home, provided that the home conditions are suitable, breas feeding is achieved and a proper feeding and nursing technique used. In fact, th results obtained in a good home will probably be better than those obtained in a institution with inadequate facilities for the care of the premature baby.

The problem is, however, rather different in the case of smaller babies, wh are liable to cyanotic attacks, feeding difficulties, and other complications of extrem prematurity. In such cases, the constant presence of a "premature baby trained" nurse or midwife is essential, and early removal to an institution equipped t deal with premature babies is likely to give the best results.

A combination of good institutional care for the smaller infants and good hom care for the larger ones should go far towards reducing the present high mortalit rate of the premature baby.

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CLINICAL ASPECTS OF PSYCHIATRIC PROBLEMS IN THE ARMY

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THE soldier's job is to be a fighting man, and to convert the recruit into this is the sole object of his entire training. In his approach to each case the Army psychiatrist regards the interest of the Service as of paramount importance, his primary duty being always to promote the efficiency of the Army as a fighting machine. A consequence of this is that whereas in some cases it may be to the best advantage of the man for him to be retained in the Service, the interest of the Army is served by his discharge to civil life, where the sympathetic family circle may succeed in perpetuating his hypochondriasis. In order adequately to fulfil his duty the Army psychiatrist requires to have wide practical knowledge of the Army, of the conditions under which men live, and the discipline and training to which they are submitted. Enlistment into the Army results in exceptional demands on the individual and subjects him to stresses of a type which he would never have encountered in civil life. It is not remarkable therefore that Service life may with special frequency bring into prominence certain symptoms, although the underlying fundamental psychopathology differs but little from that which determines similar illness in civilians subjected to strain of comparable degree. To become a fighting man the individual's physical capacities are put strongly to the test; hence the frequency of psychosomatic symptoms.

Likewise, Service requirements make a special call on the man's mental equipment, and the psychiatrist sees many patients in whom illness is due mainly to this having proved inferior to the task allotted. As Tredgold (1942) has put it, "whereas in the last war the soldier had to adapt himself to discipline, in this he has to discipline himself to be adaptable." This need to be adaptable gives special significance to the quality of his mental equipment; i.e., his general intelligence, special aptitudes, stability of temperament and strength of personality. In every case, whatever the symptomatology, the prognosis with regard to continued Service has to be given; therefore a proper assessment of these factors is always made.

THE DIFFERENTIATION OF PSYCHIATRIC CASES

An irrational belief is sometimes found that the presence of psychoneurotic or other psychiatric disability in itself excludes organic disease. In practice both are often present, and it behoves the military psychiatrist invariably to pay careful attention to the physical state of each patient.

Two classes of psychiatric patients must be clearly differentiated: (*a*) those who break down without acute battle experience and (*b*) those who break down only with acute battle experience. Of the first class there are five principal groups of cases. These are mental deficiency of various degrees, psychopathic personalities, and the three main psychoneurotic reaction types.

It is uncommon indeed to meet with cases of obvious mental deficiency, but higher grade cases are frequently found, the men having broken down, usually

developing anxiety states or becoming involved in disciplinary trouble, larg
owing to their inability to compete on equal terms with their comrades or w
their work. The modern soldier has to acquire many skills and much knowled
in the attainment of which his native abilities may be overtaxed. The introducti
of personnel selection methods, whereby men are allotted training and assign
to duties well up to, but not beyond, their native capacity, has resulted in a notal
decline in sickness among less well-endowed personnel. Psychopathic personalit
occur frequently. These are commonly seen in civilian life among adolescen
but life in the Army reveals many cases in all age groups. Such persons ha
exceptional difficulty in adapting to community life and, it is among these that t
more obvious failures of morale are found. Frequently the inadequate, tim
psychopath gives a long history of hypochondriasis. The aggressive psychopat
on the other hand, soon finds himself in disciplinary trouble, resents his traini
and is hostile to authority. The homosexual psychopath in many cases concea
his disability and it is often to the psychiatrist that he first makes confession.

The largest number of cases is embraced by the three main psychoneuro
reaction types, viz., anxiety states, hysterias and obsessional-compulsive syndrome
Of these the most common is the anxiety state in which the symptoms are frequent
numerous, the usual concomitants being somatic dysfunction and depressio
Many of these depressions are reactive, induced by personal difficulties 'and di
appointments, both in the Service and in domestic life. Next in frequency come tl
hysterias, but true conversion hysteria is rather rare, although dyspepsia is n
uncommonly a conversion symptom. Obsessionals notoriously have difficulty
adapting to new conditions, and the obsessional neuroses are frequently precipitat
or aggravated by difficulties of barrack-room life. Frustration is frequently the l
of the soldier, and the resistance of the obsessional to prolonged frustration is lo
In all these conditions a lesion of morale is implicit. This applies just as mu
in civilian practice when the neurotic has patently failed in his responsibiliti
to society, but it is more immediately apparent and significant in the Army. I
each case the extent of the morale lesion requires careful assessment. In mar
a case the officer or man has done his best to cope with his difficulties prior to h
eventual failure and lapse into illness. Not a few psychoneurotics have be
decorated in the field.

CLINICAL SYMPTOMS

In clinical practice the most common complaint is *headache*, usually described
a tight band constricting the frontal region. This headache is often associat
with depression which is attributed by the patient to the persistent headach
although in reality the reverse relationship is more often true. The headache rare
responds to any form of drug therapy for more than a few days.

Next in order of frequency is *depression*, with which are usually associat
insomnia, apathy, inability to concentrate, loss of confidence and tearfulness, an
frequently a strong element of self-pity and dependence. Many of these depressior
are reactive to real or imagined difficulties and are allied to a general anxiety stat
Some psychiatrists have found that such patients are helped by electrical convulsi
therapy, and after four treatments many are well and do not relapse, where
endogenous depressions tend to recur, even after a good temporary response t
electrical convulsion therapy: but the experience of other psychiatrists has n

confirmed this. When depression is related to domestic troubles the Army Welfare service is of great help in resolving a man's difficulties.

Rather less frequently the principal symptom is *dizziness* which is commonly associated with complaints of disturbed vision, especially blurring or clouding of the vision, almost always psychoneurotic and interfering seriously with the man's military efficiency.

Dyspepsia is of common occurrence and ranges from the one extreme of the case in which the etiology is entirely organic to the other in which the etiology is entirely psychogenic; but in most cases there is a mixture, varying in degree, of organic and psychogenic factors, and such cases do not improve for any length of time unless treatment is directed towards both causes. In the Army, limits of time have prevented such treatment and many cases have been discharged from the Service forthwith or after an early relapse.

Effort syndrome, a common complaint early in the war, has declined in frequency. Many cases have a mixed organic and psychogenic etiology and all require careful assessment, both physical and psychiatric, before the prescription of suitable remedial training.

It was foretold by Culpin (1940) that *night-blindness* would become a popular malady and this prophesy has since become true, although of recent months the incidence has declined considerably. These men are mostly obvious neurotics, frequently with various other fears linked with fear of the dark. Usually they give good service in the Army if assigned to duties in which night vision is unnecessary. Their fundamental personality tends to be rather better than that of the general run of Service neurotics.

Enuresis is a common complaint. In some cases it has caused embarrassment in civil life, but in others it has been accepted without any feeling of inconvenience until barrack-room comrades show their resentment. Only rarely have men simulated this condition and, in any case of doubt, admission to hospital for observation has shown that the voiding is usually genuinely beyond control. Those who are not too dull and backward have in many instances quite a good prognosis. Cystometry is performed and the capacity of the bladder to dilate is estimated. If this is satisfactory, systematic re-education and, in some cases, primary education in sphincter control have in many cases met with lasting success.

Amnesia is a common complaint, especially in disciplinary cases when the man claims to know nothing of the offence with which he is charged, usually absence without leave or desertion. Stephenson (1943) has found in Naval cases that amnesia is nearly always associated with other neuropsychiatric abnormalities, of which the commonest are:—depression or anxiety, post-concussional state, previous history of amnesia, mental defect, psychopathic personality, neuropathic family or personal history, history of previous hysterical conduct, and alcohol.

In the Army many cases are not genuine amnesias but are an attempt, usually by an unstable person to avoid the consequences of his conduct ; and psychiatric examination, whilst not exculpating him, is useful in that the man's instability is now recognized and provision for it within the Service can be made.

The relation of dermatology to psychiatry has been discussed by Hellier (1944), and it is widely recognized that many *skin reactions* are psychogenically conditioned. In the Army many cases are seen by psychiatrists but in most of these it has not

been practicable to attempt psychotherapy, psychiatric advice being limited t
suitable disposal within or without the Service.

HOMOSEXUALITY

The disposal of a homosexual presents many difficulties to the Unit Medical Office
and consequently most suspected cases are referred to the psychiatrist. Man
more cases previously unrecognized are identified by the latter. The homosexu
psychopath is usually referred on account of quite other symptoms, the mos
common of which curiously enough is headache. Cases with several other definit
psychoneurotic features, such as persistent overt anti-social conduct, or genuin
concomitant neurosis, or real depression, are only a liability to the Army, whos
interest is served best by their discharge. Others fear that they may lose contro
over their desire with resulting disgrace and ostracism: this can be helped greatl
by frank discussion and encouragement. Those of relatively stable personality
who merely indulge themselves without shame or remorse, are a menace to th
morale of others who have to associate with them, and firm disciplinary actio
should be enforced.   Some men claim to be homosexuals in the hope of obtainin;
their discharge; but these are quickly detected by the experienced psychiatris
and dealt with suitably. The inter-personal relationships of the barrack room
in which a monastic life is experienced, revive interests of early years which i
civil life would probably have remained dormant; permanently; and in the elucida
tion of any case of alleged sexual deviation the psychiatrist studies the case in it
total setting.

MALINGERING

It is well to remember that in civil life most psychiatric cases seen have sough
assistance, whereas in the Army not a few are referred to the psychiatrist as thei
officers are dissatisfied with their work or their conduct. Actual malingering is rare
though by no means unknown. It is fair to record that the psychiatrist is less likel
than any other responsible officer to be deceived by the malingerer. Consciou
exaggeration of symptoms is common and is a useful indication of the impoverish
ment of the man's morale.   Torrie (1944) found nearly all to be timid i
temperament.

TREATMENT

In civil life the tendency has been to deal only with those who have developed over
illness.   In the Army it is necessary to anticipate breakdown and when possibl
to take preventive measures. A common premonitory sign is disturbed sleep, and
if this can be treated promptly and the attendant anxiety relieved, the sufferer often
quickly becomes fully efficient. When a man is recommended for discharge on
account of psychiatric disability, the psychiatrist has to consider whether or not his
condition is attributable to, or materially aggravated by, military service, and to
express his opinion on this for consideration by the Medical Board which adjudi-
cates the case. The decision on each case is by no means easy and depends on
careful assessment of all the information elicited. The incidence of psychosis is
slight, and all such cases are dealt with in Military Mental Hospitals established
for this type of case alone.

There has been but little time available for psychiatric ambulatory therapy in
the Army. Such therapy occasions unusual administrative problems and involves

absence from duty which militates against satisfactory progress. Quite a number of men have been enabled to continue on duty, in spite of serious neurotic handicaps, when aided by brief, superficial psychotherapy at infrequent intervals, given mainly by the Medical Officer, advised in some cases by the psychiatrist. Otherwise, treatment of the neuroses is undertaken only after admission to special centres, both military and Emergency Medical Service, where the psychiatrists devote their whole time to therapy. The essential factor which determines the success or failure of therapy is the effective management of the man's impaired morale and his discouraged attitude to service. The individual treatment by the psychotherapist is the keystone in the management of each case, but it is essential to have a well-organized environment permeated by the atmosphere of good military discipline, with a full programme of physical training, interesting work and stimulating recreation, all orientated towards a return to active military service. For others, who, after treatment, will be returned to civil life, this military atmosphere is unnecessary, if not indeed undesirable. The two groups do not mix well and are best treated in separate establishments. The methods of psychotherapy employed are those commonly used in civil practice.

BATTLE CASUALTIES

The second great class of psychiatric cases comprises psychiatric battle casualties. Though many of these reveal predisposition to break down under stress, most of them, in a well-selected Army, are men of good personality and stability who have become ill only under great stress. In psychiatric battle casualties the onset is often sudden and dramatic, premonitory symptoms having been absent or more commonly having passed unobserved in the heat of the fray. The symptoms tend to be so florid as to hinder their recognition, which is imperative if early treatment is to be prescribed; the success of treatment depends largely on the promptitude with which it is applied. Although the onset may be sudden and dramatic, careful history-taking usually reveals a chain of premonitory symptoms, the most typical of which is the change in temperament and personality, especially a shift in the prevailing mood and resort to drink and tobacco. Various indications of loss of emotional stability and control are sure pointers, and insomnia, headache and jumpiness all point to a growing load of pent-up anxiety. An important physical sign is progressive loss of weight.

Adequate prophylaxis is obviously of inestimable importance in the maintenance of morale of the man and his unit. The quality of the general training and discipline of troops is the measure of morale, and to these the medical officer has much to contribute. The employment of simple commonsense psychotherapy, such as patient listening, reassurance and explanation, may turn the scales against incipient breakdown. The interruption of the vicious circle of restlessness, insomnia and fatigue by appropriate physical measures is a *sine qua non*. The unit medical officer's understanding of general psychiatric principles and attitudes will inspire the prophylactic measures which he employs to maintain and enhance individual and unit morale.

CLINICAL SIGNS.—The main clinical types of psychiatric battle casualties are:—
 (1) *Exhaustion*, due quite as much to the strain of prolonged severe anxiety as to the associated fatigue due to severe physical exertion. In this, loss of sleep

greatly increases the burden of anxiety and fatigue. The man is usually tremulou: apathetic and obviously greatly. fatigued. Treatment consists of reassurance, foo and sweetened drinks, proper bowel evacuation, and sedation to procure prolonge good sleep. In many cases this can all be carried out by an enterprising medic officer, and after twelve hours' sleep most of the milder cases settle down and ar ready to rejoin their units.

(2) *Simple terror states* may overtake the best of men if the strain is sufficientl intolerable. The man either displays the typical conduct of acute panic or h collapses into a state of confusion or stupor. Treatment comprises firm handling sedation and hot drinks, and most cases are normal 'and ready for duty within few hours.

(3) In *anxiety states in battle*, disorders of behaviour may predominate, c.g., acut panic state or uncontrolled violence. More usual are gross tremors, sweating tachycardia, confusion and marked restlessness. Some cases respond to the simpl methods of treatment applicable to cases of exhaustion, but most require a lon; period of complete physical and mental rest, procured by really full sedatioi begun as early as possible and followed up by some form of psychotherapy.

(4) *Hysterical reactions* which provide a neurotic release from intolerable stres are less common than in the last war. Usually these are amnesias or fugues, deaf ness, mutism or blindness. The sooner these can be treated the better the result: Under hypnosis or after intravenous injection of sodium pentothal, the patient i induced to recall vividly the experiences which resulted in the breakdown, the los function is quickly restored, and in most cases an early return to duty follows. If th symptoms have become well established the condition is much more resistant t treatment.

(5) *Depression* is common, especially in older men of the over-conscientious type Some of these cases respond to thorough sedation promptly given, but usually mor prolonged psychiatric observation and management are required and electrica convulsion therapy may be indicated.

(6) *Psychosis* is not common. If it occurs it is usually schizophrenia with all its bizarre symptomatology, or manic-depressive in type, when the clinical picture i: dominated by the unduly elated or depressed mood. Careful history-taking discloses many premonitory signs. All such cases are obvious liabilities to the Army and under full sedation they are evacuated to the base. It is important to bear in mind that a wounded man may also be a psychiatric battle casualty, and that not only the wound is in need of rational treatment, but the man also.

CONCLUSION

This article deals essentially with clinical aspects of Army psychiatry, and these serve to illustrate the inseparable ties which link psychiatry and general medicine. It will be recognized that the Army psychiatrist works in close collaboration, not only with other professional colleagues, but also with the officers and non-commissioned officers of every branch of the Service.

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OBSERVATIONS FOR THE PRACTITIONER IN RELATION TO DIAGNOSTIC RADIOLOGY

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GENERAL CONSIDERATIONS

Economy.—In a recent memorandum issued by the Ministry of Health the importance of economy in the use of X-ray examinations was stressed. This economy can be achieved much more readily by the practitioners who refer patients to the radiologists, than by the radiologist who undertakes the investigation. In general, the problem is a matter of proper selection of cases, and a knowledge of the proper use of radiology. The public appreciate the value of X-ray examination, but a knowledge of its limitations is often lacking, both by the layman and the medical practitioner. The practitioner who expects too much is he who expects a slot-machine diagnosis, because he has not taken the trouble to assess his clinical facts. One such example recently occurred. The request was for the following X-ray examination—in one breath—chest, barium meal, complete genito-urinary tract, and skull. By adopting such a procedure, waste of time and material is obvious, to say nothing of fostering organ consciousness in the patient.

It is surely not a sign of progress that every symptom of a few hours' duration demands "radiological investigation" as a short cut to diagnosis, but there is a tendency in that direction at the present time. Cases in which multiple investigations are requested usually turn out to be negative and examples of psychosomatic disorder. X-ray examination should be used to clear up a definite, specific point in the diagnosis; the attitude, "hope something will turn up," should be deprecated.

Requests.—It is not sufficiently appreciated that in hospital practice at the present time, apart from gastro-intestinal work and occasional chest screening, the radiologist does not see the patient, and all routine work is done by radiographers. This is often a handicap and can lead to errors and duplicated work, unless the history supplied is exact and all essential data are given; e.g., a note of soft tissue swellings, previous operations, and, in the case of injuries, the date, and exact site of the body involved. In private practice, on the other hand, this disadvantage does not arise.

Reports.—To avoid disappointments the practitioner should understand that it is not always possible to give a definite negative or positive report. There are cases which are indeterminate on account of (1) faulty radiography, e.g., poor technique, bad positioning; (2) gas shadows obscuring urograms and cholecystograms; (3) inadequately prepared gastro-intestinal cases, with food in the stomach and faeces in the colon; (4) shadows that require observation over a period to determine their nature.

The practitioner should be prepared to understand these difficulties, and

cooperate in a repeat examination rather than expect an immediate reading, which may be false.

In the earlier days of radiology it was the attempt to justify each X-ray examination that made radiologists resort to inconsequential verbosity in such doubtful cases. To-day, such a practice is unnecessary. Nevertheless, approach to this question of interpretation is influenced by the presentation in books of skiagraphs with a ready-made label, and complete diagnosis. If the practitioner ponders for a few moments, he will realize that the diagnosis was supplied after a period of time, when all investigations were complete, the patient well, or with a post-mortem report for a guide.

It is unfortunate that there is no generally accepted standard of radiological terminology. Publications on terminology have appeared (Kerley et al., 1939) but the suggested terms are not in general use. However, a committee has been formed to consider the foundation of a Radiological Research Institute on the lines suggested by Barclay (1943), and part of this work will deal, no doubt, with the whole question of normal and variational radiological anatomy and terminology.

In so far as radiology provides only one piece of evidence in the diagnosis, it may be said that the radiologist should limit his report to a description of the deviation from normal structure or function, and nothing more. In many cases it is possible to go one step further, and suggest that the radiological findings are consistent with a specific disease or condition; occasionally, the diagnosis is entirely radiological, e.g., osteopetrosis (Albers-Schönberg disease).

SPECIAL CONSIDERATIONS

(A) *Positioning.*—Not only in relation to fractures, but in every part of the body mal-positioning can compete with the best examples of surrealism. A knowledge of the traps which beset interpretation of unusual views should be known to those practitioners who are sometimes faced with reading their own films. In fact, it is possible to be deceived into thinking that fractures exist because of various artefacts and superimposed shadows.

The monumental work by Miss Clark (1939) has helped enormously to improve radiographic technique. Recognized standard positions are being taught, and are in general use. For example, all that is necessary is to compare films of the hip joint taken with the foot in medial rotation and in lateral rotation. In the latter position the neck of the femur appears short, and the lesser trochanter is prominent.

(B) *Serial examinations.*—One X-ray examination does not necessarily exclude injury or disease. In skeletal radiography, striking radiographic changes may be seen a few weeks after a negative report, without any indication of such from the clinical condition. Some fractures may become apparent only after the formation of callus, as in stress or march fractures, or in such conditions as Kümmell's disease of the spine, in which radiological changes are obtained some two or three months after injury. It is more obvious that in chest cases the lapse of a few hours or days may alter the picture. Yet it is common enough to hear tuberculosis excluded because a negative report was given some months before. In cases of suspected pulmonary tuberculosis, a monthly observation at first, followed by a three-monthly interval, is the usual procedure.

(C) *Controls.*—A control of the normal side is often of great help, and when there is doubt regarding accessory bones and sesamoids (twenty-three have been described around the wrist, and thirteen around the foot), a control is essential. It is difficult to understand why only one hip joint is X-rayed when both hips are available on the same size film. The additional information obtained from a comparison of both sides is great: Shenton's line can be compared with greater accuracy; an os acetabuli (accessory bone) can be substantiated; a developmental shallow acetabulum can be noted. In children, a comparative film of the normal joint is essential when separation or disease of an epiphysis is under consideration.

SKELETAL SYSTEM

(A) *Fractures.*—Information required by the radiologist is the date of injury, and the exact part implicated. To a radiographer, a request for an ankle means only the ankle joint. Yet the practitioner thinks this will include the whole tarsus and metatarsus, and does not realize that different projections are necessary for these parts. In the case of ribs, if it is suspected that the fracture is in the mid-axillary line, such information should be given because an oblique view may be necessary to show the fracture.

Owing to the complex shadows in the skull, radiographic detail is of paramount importance in diagnosing fractures. With the patient in bed it is scarcely possible to obtain this with a portable apparatus, nor is it any easier with the high-powered plant in the department, if the patient is at all restless. The immediate problem in skull injuries is concerned with damage to the brain. Therefore it is much better to wait until accurate work can be done.

(B) *Metastases.*—There is a tendency to forget the possibility of bone metastases in patients who have had a primary malignant lesion, and who subsequently complain of vague pains in the limbs and back. The original local site may appear clean and healed, and the practitioner is put off his guard. Therefore it is important to have an X-ray examination before embarking on a course of physical therapy in any patient who has a history of previous malignant disease, even years before. Also, it is as well to remember that metastases can and do occur, without a primary lesion being discovered. Often the type and position of the bone metastasis can give a clue to the primary tumour, e.g., carcinoma of the prostate, hypernephroma of the kidney. The pelvis is one of the most common sites of metastases, and Brailsford (1935) goes so far as to suggest that this area should be X-rayed as a routine before undertaking any operative procedure for the removal of a malignant tumour. This may well be done in tumours of the breast, thyroid and prostate.

THE CHEST

The standard position for a chest X-ray is the erect postero-anterior (not antero-posterior), at five or six feet distance, with the arms so arranged that the scapulæ are thrown clear of the lung fields. This is mentioned because the usual request is for an "A.P." chest, a contraction which is often used to denote "artificial pneumothorax."

The interpretation of portable skiagraphs must be reserved, unless the film is of good quality. The short distance at which portable films are taken, and the

distressed condition of the patient's breathing, lead to distortion of such a degree that accurate reading is often impossible. One speaker at the meeting at the Royal Society of Medicine on blast injuries of the chest said that often the immediate routine portable film taken on arrival at the hospital was misleading. Similar difficulties are met with in the interpretation of skiagraphs of babies.

It is of great help to the radiologist to be given information about the quantity of sputum and the result of its examination; also, any history relating to previous disease, such as empyema, pleurisy, or sanatorium treatment. Mild degrees of scoliosis are frequent, and in reading chest films the presence of scoliosis or rotation should always be noted because they can alter the whole appearance of the lung fields, mediastinal shadows and position of the heart.

Whilst radiology will supply information about the presence or absence of abnormalities, the discovery of the cause or nature of the abnormal findings may be based on other observations, as illustrated by the following:—

(i) Opacities due to *Hodgkin's disease*, or *hydatid disease*. In the former case glandular masses elsewhere may supply the answer, and in the latter the history, blood tests and intradermal reactions.

(ii) *Bronchiectasis* may be present which has resulted from an early carcinoma of a bronchus; secretions retained by the partial mechanical block causing areas of atelectasis, and infection and dilatation of the distal bronchi. The discovery of the carcinoma at this stage may only be traced by bronchoscopy and further radiological investigations, such as bronchography and tomography.

There are certain conditions which are so typical that a reasonable attempt can be made to suggest the cause, but it is equally true that shadows with exactly the same appearances can have a totally different etiology. At a recent meeting at a chest hospital, a case was shown in which lobectomy was done for a suspected new growth. The "tumour" turned out to be a tuberculous focus.

Great interest has arisen in *mass radiography* and its use in the detection of unsuspected tuberculosis. Surveys have shown that it is quite impossible to express an opinion from a single film, regarding non-activity of pulmonary tuberculosis. Some recent Australian figures of a comparative nature on this point indicate that a proportion of cases of so-called "healed tubercle," as shown on the skiagraph, had positive sputum tests. The question of non-activity must be assessed by serial X-ray observation and clinical findings. The association of pain in the chest or arms is not often linked in the practitioner's mind with pulmonary tuberculosis, yet it should be remembered. On two occasions I have found tuberculous infiltration of the lung in cases referred for suspected cervical rib.

Radiology can be of help in *heart disease*, apart from its application in mensuration; i.e., a case of doubtful mitral stenosis can be proved by finding regional enlargement of the left auricle. In congenital heart disease, a characteristic configuration is often present. Some doubt has been expressed recently on the accuracy of the cardio-thoracic ratio as a means of heart mensuration. But it is a simple method and, provided too much reliance is not placed on its application in the transverse type of heart and in the patient with the broad lower thorax, its use is justified as a rough working guide.

ALIMENTARY SYSTEM

STOMACH.—In the earlier days of radiology, great importance was attached to gastric tone, a condition which is an expression of the patient's habitus. A stomach which is hypertonic or hypotonic is merely an anatomical variant. Likewise symptoms can and do arise from gastroptosis, but not necessarily so. Tone must not be confused with peristalsis, although these usually vary directly with each other. Of interest in this connexion is a phenomenon that occurs occasionally. During screening the radiologist witnesses a sudden sagging of the stomach. This is a warning that the patient is about to faint, and precautions can be taken at once.

Although a lesion may be seen on the screen, it is not possible always to reproduce this exactly on the film. Because of this fact the report may not tally with the film appearances. Conversely, some film appearances are only apparent (e.g., the pseudo-niche of Haudek—overlap of barium in a diverticulum at the duodeno-jejunal flexure, simulating an ulcer of the lesser curvature of the stomach).

The old "meal" has given place to a pure chemical barium emulsion, the passage of which through the stomach is somewhat quicker. The barium meal gives no information about digestive function; it simply attempts to demonstrate any alteration of structure. But that does not mean that information relating to gastro-duodenal hurry or sluggishness is not of value in treating the patient.

Surprise is often expressed when recent cases of hæmatemesis show no abnormality. The explanation may be that the cause of the hæmatemesis is a superficial erosion which has healed, or that the erosion is so superficial that it cannot be detected in the ordinary routine examination. On the other hand, it is not uncommon to find an extensive lesion with few or slight symptoms.

Carcinoma of the pyloric end of the stomach—the most common site—gives a mental impression of obstruction, but this is by no means always the case. The malignant infiltration, by destroying the musculature, can cause gaping of the pyloric region and barium to pour into the duodenum.

Unconscious aerophagy is a frequent cause of abdominal discomfort and, when associated with spasm at the pylorus and the cardia, can give rise to acute pain. Pyloric spasm is a common finding, and whilst it can be a referred phenomenon, it can also result from an emotional reaction. Thus there is a wide normal variation in the emptying time of the stomach, and too much reliance must not be placed upon this one finding unless it is accompanied by other signs of obstruction, such as active, unproductive peristalsis, which is followed subsequently by complete absence of peristalsis and atonia (exhaustion).

A word must be said about gastritis, which is again a fashionable medical topic. Information gained by the increasing use of gastroscopic examinations has supported the radiologist to some extent in his diagnosis of gastritis, but radiology can only demonstrate the so-called hypertrophic type. On a point of clinical interest, when a history of episodic vomiting over a number of years is given, it is usual to find signs associated with the radiological diagnosis of gastritis.

Duodenum.—There has been much recent criticism regarding the word duodenitis, but the critics have not supplied a better term for a condition which does exist as a radiological entity. Some radiologists use the term duodenitis for a deformity of the duodenal cap which is not constant, and in which they are unable to see, or demonstrate, an ulcer crater or constant incisura. This unstable deformity

can be caused by extrinsic conditions, such as chronic appendicitis and chronic cholecystitis. Cordiner (1942) maintains that a duodenitis has features, such as rapid transit of barium, increase of secretion, and mucosal changes demonstrated better by special apparatus. In so far as all radiologists have their own individual standard of this condition of the duodenal cap, there must be a liberal interpretation of its significance, according to the observer.   ·

When a chronic duodenal ulcer has caused a scar deformity, or peri-duodenal adhesions have developed, it is obvious that such a cap cannot return to a normal shape. Yet some practitioners refer such cases every few weeks, hoping that the radiologist can assess the value of their treatment or the patient's progress by the shape of the duodenal cap. In a chronic ulcer of this type, all that can be reported is the question of obstruction. On the other hand, in a recent or acute ulcer, medical treatment can alter the whole picture of apparent obstruction by diminishing pyloro-duodenal spasm.

Appendix.—The radiological diagnosis of appendicitis depends on the· collection of as many of the positive signs as possible, each of which has a relative significance. A negative radiological report does not exclude disease. The appendix sometimes does not fill with barium, but such non-filling may be a sign of disease. The examination of the appendix as a separate investigation is better than part of a "follow through" unless, of course, the time interval is adequate. It so often happens that at the six- to eight-hour interval in the case of the "follow through," coils of barium in the ileum obstruct the view of the appendix in spite of manual manœuvring and positioning. In such cases, however, by the use of magnesium sulphate, given three hours after the barium, and followed by a meal (Cambie's method), good filling of the appendix is obtained.

Few deductions can be made from a "picture" of the ileo-cæcal region, unless this is combined with screening manipulation.

Barium enema.—No case should be referred for this examination without a preliminary digital rectal examination, because this simpler method may supply the information required; further, a rectal growth can easily be overlooked in a barium enema examination on account of the shape of the rectum, and its inaccessibility to palpation.

Cholecystography.—A new medium (pheniodol) is being used for this test, and reports, so far, indicate that it has two advantages. It is better tolerated than the present dye, and the concentration of it by the gall-bladder is somewhat better.

Before accepting a non-concentrating gall-bladder as pathological, it is important to be certain that the patient has taken the full quantity of the medium, and also that an induced diarrhœa has not occurred. In any case, a confirmatory examination is advisable. When the clinical findings are highly suggestive of gall-bladder disease, and the X-ray findings are normal, it is worth while X-raying again with films taken in the erect posture. By such a device, small gall-stones may be seen floating in the mixture of dye and bile and forming a narrow band at their appropriate level.

GENITO-URINARY SYSTEM

It is surprising how often developmental abnormalities, such as double ureters and pelves, aberrant renal arteries and kinked ureters, are met with in urography.

Attention has recently been directed to these anomalies being responsible for local tasis; local stasis in turn can end in infection.

Not only is *excretion urography* a most valuable aid in discovering structural changes, but it also gives information regarding the excretory powers of the kidney.

A patient with chronic pyelonephritis developed hæmaturia and was submitted to excretion urography. Only a very faint shadow of the dye appeared in either kidney at thirty minutes; the blood urea was 125 mgm. per cent. Within three weeks the patient leveloped acute uræmia and died.

Utero-salpingography.—Although rather in the province of the specialist, salpingography should be known to the practitioner as an alternative and supplement to tubal insufflation in the investigation of sterility. It has certain advantages: it can be performed as an out-patient procedure, without an anæsthetic, and it can give a permanent record of tube patency or block, and the size and position of the uterus. There is evidence, too, that it has probably a therapeutic action.

In arranging for this test, the time factor in relation to the period is important. The test should not be undertaken within a week after the period or following a curettage, as it is possible to produce venous intravasation—a condition wherein the opaque oil is forced into the para-uterine venous channels.

Pelvimetry.—Accurate measurements of the pelvis can be obtained with a medium-powered X-ray plant, provided it is carried out quite early in pregnancy. Unfortunately, the same cannot be said of cephalometry (fœtal head measurement), which demands a modern high-powered machine. However, cephalometry is not so accurate as pelvimetry, and is only of use in vertex presentations. It is in the borderline case that cephalometry will be sought, and however accurate the measurements there will still be three unknown factors—head adjustment, pelvic give and uterine contractions. Although rather a point of technical interest, a simple method of calculation in pelvic measurement has been evolved by Cave (1944). By this method of vertical shift, the radiologist can calculate the measurements from films taken by the radiographer. No special apparatus is necessary, and no body measurements are undertaken by the radiographer.

CONCLUSIONS

To obtain the maximum diagnostic help from radiology, close cooperation between the clinician and the radiologist is essential, so that each can pool the evidence submitted.

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CARDIOVASCULAR DISTURBANCES DUE TO VITAMIN B₁ DEFICIENCY

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FROM time to time patients present themselves suffering from symptoms and signs of congestive heart failure which cannot be ascribed to any one of the common and well-known etiological factors. It is the purpose of this article to draw attention to a group of cases in which the condition was due to vitamin B_1 deficiency. The number of such cases in this country is small, but their recognition is important since they are curable by adequate doses of vitamin B_1, whereas the drugs success-fully employed in the common cases of congestive heart failure are ineffective.

It is customary to think of vitamin B_1 deficiency primarily in connexion with neurological disturbances (polyneuritis); hence cardiovascular disturbances of this nature may be missed unless it is borne in mind that cardiovascular manifestations of vitamin B_1 deficiency may, and tend to, occur in cases in which neurological manifestations are absent or only slight. Since in such patients the symptoms and signs on routine clinical examination do not fundamentally differ from those found in other cases of congestive heart failure, it seems appropriate briefly to consider first when to suspect vitamin B_1 deficiency as the etiological factor, before discussing some distinctive features of such cases.

Vitamin B_1 (thiamin, aneurin) plays an essential part in carbohydrate metabolism (its pyrophosphoric ester acting as a co-enzyme in the breakdown of pyruvic acid) and the requirement in man depends on the caloric intake and is raised the higher the metabolic rate and the greater the intake of carbohydrate (fat being vitamin B_1 sparing). The minimum daily requirement for an adult consuming 3000 calories was laid down by the League of Nations Committee on Nutrition to be 300 International Units (333 I.U. = 1 mgm.), the optimum being 3 to 4 mgm. There is, however, no universal agreement about the minimum daily requirement, one great difficulty in experiments on man being the marked variations in the vitamin B_1 content of natural foodstuffs. Recent work by Najjar and Holt (1943), working with a synthetic diet, throws new light on the problem by showing that to a certain extent vitamin B_1 apparently can be synthesized by bacteria in the large intestine whence it is absorbed. This phenomenon may explain the discrepancies in the statements about the minimum daily requirement. The most important sources of vitamin B_1 are wholemeal bread, wheat germ, whole cereals, green vegetables, pork, mammalian liver, nuts. Yeast is particularly rich in vitamin B_1.

CAUSES OF VITAMIN B₁ DEFICIENCY

Vitamin B_1 deficiency may arise as the result of (1) inadequate intake; (2) inadequate absorption, and (3) increased requirement, or a combination of any such factors.

(1) *Inadequate intake* due to a badly balanced diet may be due to poverty, to ietetic eccentricities, or to unduly long perseverance with certain dietetic regimens, g. ulcer diet.

(2) *Inadequate absorption* may be due to prolonged vomiting, diarrhœa, inflamation of the gastro-intestinal mucosa, short-circuiting operations, gastro-colic stula, and such like.

(3) *Increased requirement* is present in conditions resulting in increased metaolism (prolonged pyrexia, pregnancy, hyperthyroidism, prolonged strenuous hysical exertion).

A combination of all three factors is often present in chronic alcoholism.

It follows that in any of the above conditions vitamin B_1 deficiency may develop nd produce cardiovascular disturbances.

Most of the cases seen in this country are due to chronic alcoholism. Here, ncreased requirement due to a high caloric intake in the form of a carbohydrate s combined with inadequate intake of the vitamin, since alcohol contains very ittle vitamin B_1 and chronic alcoholics frequently suffer from anorexia. Moreover, wing to the presence of an alcoholic gastritis often associated with vomiting and liarrhœa there is, in addition, inadequate absorption of what little vitamin B_1 such atients may ingest. If a patient then takes a fancy to some foodstuffs rich in arbohydrate and at the same time develops a pyrexia, extreme signs of congestive leart failure due to vitamin B_1 deficiency may appear in a short time (Schott, 1944). Alcohol as such, however, without vitamin B_1 deficiency, does not produce he cardiovascular changes described in this article.

CLINICAL SIGNS AND SYMPTOMS

The symptoms and signs of such patients, whilst also found in cases of congestive heart failure of common etiology, present some distinctive features which are of diagnostic interest. The outstanding symptoms are general weakness, proneness to fatigue, palpitation, dyspnœa on exertion, in some cases disproportionately aggravated by even the slightest exertion, and in some cases continuous dyspnœa and nocturnal attacks of cardiac asthma. Some patients complain of a dry non-productive cough of a brassy, hacking character, reminiscent of the cough in aortic aneurysm or mediastinal tumour.

On examination the patient may be pale, the mucous membranes being affected and the tongue smooth, indicating anæmia. It has been shown that the circulation rate is increased in such cases, the arterioles being dilated, which accounts for some distinctive features: the skin is often warm and flushed, there are prominent cardiac, epigastric and arterial pulsations, with loud sounds over the large arteries ("pistol-shot sounds"). The tachycardia is sino-auricular in origin and usually moderate in degree, about 90 to 120; it may be absent. Extrasystoles have been reported in some cases, but usually the rhythm is normal. The heart may be normal in size or enlarged (chiefly to the right); radiological examination is valuable, since the prominent pulsations may suggest cardiac enlargement which is not always confirmed by X-rays. Moreover, the chest film may show signs of pulmonary congestion of a marked degree, whereas the auscultatory signs may be absent or slight, consisting only of a few moist râles over the bases. An enlarged liver is often

palpable. The presence and degree of œdema vary considerably in different cases. It may be dependent, diffuse, or of unusual distribution, and in one of my patien was transient, appearing in the course of a few hours, lasting for varying perio of time and disappearing in the course of a few hours. It may affect the ankles a calves, face or genital organs, and there may be ascites. The amount of flu retained is often enormous and far in excess of the estimate, as proved by the lo of weight and profuse diuresis as a result of adequate treatment.

A curious feature in some cases is a sudden marked deterioration of the cardi vascular condition, either precipitated by exertion or pyrexia, but also occurrin while the patient is at rest, without any known precipitating factor. This featu is well known in oriental beri-beri ("shôshin"), in which it is associated with rap and painful enlargement of the liver. Weiss and Wilkins (1937) observed fi instances of syncope amongst 120 patients and showed that this was due to hyperactive carotid sinus reflex which disappeared after adequate treatment.

Electrocardiographic changes have been reported in a considerable number cases. The main changes are smallness of the initial ventricular deflections, di tortion of the R-T intervals, abnormalities of the T waves, which may be dom shaped, diphasic or inverted, and lengthening of the electrical systole (Q- interval). But even in cases with marked cardiovascular disturbances the electr cardiogram may be normal.

Neither pathognomonic heart murmurs nor constant changes in arterial venous pressure are found.

Coexisting changes affecting systems other than the cardiovascular, if preser support the diagnosis. Some signs of polyneuritis are often found, viz., mot weakness, loss of knee and particularly ankle jerks, tenderness of the calf muscle paresthesiæ and impairment of vibration sense, but they are hardly ever so mark as in cases of vitamin B_1 deficiency without cardiovascular disturbances. Moreove it has been found in oriental beri-beri, as well as in cases of vitamin B_1 deficienc in the United States and Europe, that when there is marked polyneuritis, cardic vascular changes are usually mild; this is presumably due to the fact that th activities of these patients are limited to such an extent that their cardiovascul: system is protected. Conversely, signs of a hitherto latent vitamin B_1 deficienc may suddenly become manifest as a result of severe exertion or a concurren pyrexial illness.

Since a diet grossly deficient in vitamin B_1 is most likely also to be lacking i other vitamins, signs of multiple vitamin deficiency are often present and may b of diagnostic help. They include signs of deficiency in other constituents of th vitamin B group, such as dermatitis, mental changes and gastro-intestinal dis turbances, as found in pellagra, purpura, conjunctivitis, anæmia, and sometime signs of riboflavin deficiency.

TREATMENT

The prognosis in such cases is usually good, although according to some report sudden death may occur in spite of adequate treatment. The polyneuritic symptom tend to clear up more slowly and less completely than the cardiovascular symptoms the improvement of the latter is often rapid and marked.

Treatment consists of complete rest in bed and the administration of adequate doses of vitamin B₁, preferably combined with other vitamins. In severe cases 15 to 25 mgm. vitamin B₁ should be given daily, intramuscularly or subcutaneously. During the first few days of such treatment the clinical condition may become worse and the electrocardiogram may temporarily show aggravation of the signs of myocardial damage, sometimes simulating coronary disease or even coronary occlusion. Failure to recognize this as a temporary occurrence during vitamin treatment may result in unnecessarily doubting the correct diagnosis or erroneously assuming coexistent myocardial disease due to a second etiological factor, e.g. coronary disease. After this initial stage, however, improvement is usually fairly rapid, the outstanding features being increase in general strength, profuse diuresis and marked loss of weight, improvement in breathing and cough and disappearance of the signs of increased circulation rate (flushing, præcordial pulsations, bounding pulse, "pistol-shot" sounds over the arteries). If the heart was enlarged it may considerably decrease in size, the clinical and radiological signs of pulmonary congestion becoming less marked. Digitalis and mercurial diuretics are without effect (Bowe, 1942).

The further plan of treatment depends on the patient's progress. If this is satisfactory and gastro-intestinal disturbances likely to interfere with absorption (diarrhœa, vomiting) have disappeared or improved, the injections of vitamin B₁ are gradually replaced by oral administration and the dose may then be reduced to 3 mgm. t.d.s. Moreover, in view of the fact that a multiple vitamin deficiency is often present, it is essential to persuade the patient to take a full and well-balanced diet which should include green vegetables, cereals, liver, butter and fruit. In the case of alcoholics this is notoriously difficult, requiring considerable patience and perseverance on the part of the practitioner as well as the patient's relatives. It is often advisable to add the other constituents of the vitamin B complex by giving benerva compound, 2 tablets t.d.s., or B-plex, one dessertspoonful t.d.s., also vitamin C (ascorbic acid), 50 mgm. once or twice a day, and iron, e.g., fersolate, 1 to 2 tablets t.d.s., or iron and ammonium citrate, 30 grains t.d.s.

Whilst it is often desirable for general reasons that an alcoholic patient should make an attempt to become teetotal, it has been established that adequate treatment with vitamin B₁ is effective, even if the consumption of alcohol is maintained. The therapeutic effect of vitamin B₁ is, of course, the conclusive diagnostic proof, since in cases of congestive heart failure not due to deficiency its administration is ineffective.

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CHILD HEALTH

VII.—RESIDENTIAL SCHOOLS FOR HANDICAPPED CHILDREN

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AMONG the many civil casualties of the war the residential special school takes an important place. Some of these schools have been completely closed down; others, as a consequence of evacuation, damage by enemy action or the requisitioning of part of their premises for war purposes, are working on a much reduced scale in makeshift surroundings, whilst all are acutely affected by the shortage of suitable staff. At present, and for some little time to come, it is and will be necessary for some children who are in genuine need to be denied the benefits which a residential school might confer, and for others to be sent to the school which can admit them most quickly rather than to the one which is best suited to their requirements. The future is, however, bright with promise. It is too early to forecast the precise effects which the new Education Act will have, but there is little doubt that one of them will be an increase in the provision of residential schools and a widening of their scope. If therefore some of the suggestions made in this article on the selection of children for these schools seem a counsel of unattainable perfection at the moment, it may fairly be hoped that the opportunity for their practice will not be too long delayed.

The record of residential special schools is good. They supply a definite and important need and they achieve a great number of successes. Many of their failures are failures in appearance only and occur because the parent or the practitioner does not properly appreciate the function of the school and expects it to do the impossible. It is only natural for the parent to hope for a miracle and it is the duty of the practitioner to be honest and even over-cautious in his prognosis. There are, however, a number of actual failures and many apparent successes which still fall short of what might have been achieved. Occasionally these are the fault of the school, but they most commonly happen either because the child is unsuitable for a residential school or because the school is unsuitable for the needs of the particular child. The key to success is wise selection, which is an individual problem, since no two children and no two schools are precisely the same.

THE PROBLEM OF SELECTION

The child.—The most important error in selection is to confine it to medical or surgical grounds. The problem has important psychological and social elements and it is necessary to think of the child in terms not only of his present condition but of his future, and of his environment. The aim of all work in child health is to produce a physically sound and psychologically adjusted adult, capable of and engaged in employment which renders him self-supporting. Childhood and adolescence form a continuous period of preparation, during which the immature individual is protected from adverse influences and subjected to favourable ones, at the same time receiving training, first general and then specific, which is to fit him for responsible adult life. Care and protection are normally provided by the family, with the assistance of various private and public agencies. Continuity

and smoothness during the transitions from one phase of training to another are normally ensured by the family unit, but the circle of schoolfellows and workmates has also an important part to play in the development of the child and adolescent.

It follows that any removal of the child to a residential special school will have certain harmful tendencies. It will interfere with the normal course of social and psychological development, it will break the continuity of the developmental process by requiring the child to adjust himself to two sudden changes—that from the home to the school and that from the school back to normal life—and it will impress upon the child that he is different from his fellows and may, as a result, render him timid and insecure. Against these harmful potentialities must be balanced the favourable factors. The defective child may already be conscious of his inferiority and may benefit by transfer to an environment in which he lives among others who are handicapped. The residential school may provide care, protection and treatment which cannot be obtained in the home, or the home may possess inevitable intrinsic faults which would in themselves have a harmful effect. The decision to send a child to a residential school can therefore only be reached by a careful weighing of all these considerations as they apply to each individual child, always with a view to the secure future establishment of the child in society.

In certain instances the decision is never in doubt. Examples are the following:—

(1) The child whose defect or handicap is such that he will never be able to lead a normal life and will always require the shelter of an institution. The most common single defect in this class is mental deficiency. Single physical defects are rarely so completely handicapping, but combinations of two or more defects can produce such a result.

(2) The child whose defect is capable of complete or almost complete cure but who cannot be provided with the appropriate treatment outside a residential school, e.g., prolonged orthopædic treatment.

(3) The child whose defect is incurable but who can be trained or educated to overcome it by means which can only be provided in a residential school, e.g., total or partial blindness and deafness or deaf-mutism.

In the first of these three classes it is obvious that since the child will never be able to lead a normal life there is no point in delaying his start on the necessary abnormal life. In the other two classes it is equally obvious that the advantages of the residential school are so great as to outweigh the disadvantages. Unfortunately, the majority of handicapped children do not fall into these categories and the elements of doubt are considerable. The practitioner who has to make the decision might profitably give special attention to the following questions:—

(a) Is the child's home a suitable place for a child suffering from such a disability?

This will involve an assessment of the physical conditions of the home, particularly in respect of light, ventilation, the availability of suitable places for outdoor play and exercise and the general surroundings and climatic conditions. Poverty and overcrowding will obviously affect any child adversely.

(b) Are the child's parents capable of caring for him adequately in view of his disability?

The normal child may thrive in spite of parental neglect; the handicapped child is less happily situated. It must be remembered, too, that the over-anxious and

over-careful parent may be as great a menace to the handicapped child as the feckless parent.

(c) Is the child happy and psychologically well-adjusted in his home?

The issue here is even less clear-cut. In some instances the previously well adjusted child stands the shock of removal from home better than the child who was unhappy with his family, but in general there is some risk attached to the disturbance of a sound and well-established family relationship.

(d) Is the child's disability actively interfering with his education?

The disability may be of such a nature as to prevent the child from attending school or to cause frequent and prolonged absence from school. Alternatively i may prevent the child from profiting by education when he is actually in attendance but this is not common. Broadly speaking, if the child is physically fit to attend school he is physically fit to receive elementary education, exceptions being the epileptic and the wholly or partially blind or deaf child.

(e) If the answer to question (d) is in the affirmative, is it reasonably certain that his transfer to a residential school would reduce or eliminate such interference?

If the child's disability takes, for instance, the form of intermittent attacks of a partially disabling condition or illness, would the severity and frequency of such attacks be reduced by his transfer? Doubtful cases occur in which it may be worth while transferring the child for a trial period.

(f) Is the child intellectually capable of profiting by education in a residential school?

Obvious physical defect may be combined with unnoticed moderate degrees of mental defect and the backwardness of the child attributed to the interference of the physical defect with normal education. For this and other reasons, which are mentioned later, it is wise to estimate the intelligence of any child who is being considered for admission to a residential special school.

(g) Can a residential school provide any facilities for the treatment of the child's defect which are not available while he remains at home?

Obviously an affirmative answer here will have an important effect upon the final decision, but the mere availability of treatment is not enough; there must be a reasonable hope of a worth-while degree of success. As in (e) above, the transfer of the child for a trial period may be of value in resolving doubts.

(h) What will happen to the child after he leaves the residential school?

If the school cures the disability or relieves it while nature effects a cure, well and good. If the school, without affecting the disability, provides an education which could have been obtained in no other way to enable the child to succeed in after life, profit may outweigh loss. But if it merely provides temporary relief and he must return later to his former handicapped and maladjusted condition it may prove a mistaken kindness to have shown him what might have been.

The school.—After the decision to send the child to a residential school, it becomes important to select a suitable school. It is worth while repeating that no two schools are exactly the same. Whereas a blind child would naturally not be sent to a school for the deaf, almost as much harm might be done by sending him indiscriminately to whichever school for the blind happened to be the most convenient or the cheapest. Plainly, the first step is to draw up a "short list" of the residential schools which cater for the specific type of handicap from which the

hild suffers, excluding any which are obviously unsuitable on such grounds as age
nd religion. The principles underlying further selection may, again, be best illus-
rated by the asking of certain questions:—

(i) Is the child more likely to "settle down" in one school than in another?

The uprooted child will take root again much more quickly if there is something
familiar in the new environment. In general, for instance, he will be happier if
at least some of his schoolfellows come from his own part of the country so that
his native accent and customs will not single him out as a butt.

(ii) Is there anything in the child's history to suggest that any particular
environmental factor is favourable or harmful?

This is of particular importance in children who suffer from asthma or chronic
bronchitis. The parent will often have discovered that when the child is on holiday
in a particular place he is considerably better, or that he is notably worse when
he visits other places. In the case of the less robust child it is generally desirable
to avoid too sudden changes of climate: a child, for example, who has lived most
of his life in Lancashire or Yorkshire, might find a hot summer in the South
extremely enervating and, if he is to go to a school in a warmer climate, should be
transferred in the autumn rather than in the spring.

(iii) Should the school be near the child's home or farther away?

This will depend upon the child-parent relationship. If frequent visits by the
parents are likely to do good they should be made possible. If, however, the parent
is to be discouraged from visiting, the more distant the school the better.

(iv) Does the type of education provided by the school suit the child's needs?

Some special schools concentrate upon craft and industrial training, some on
general junior education and some on secondary education with a view to later
business or even university careers. The handicapped child who has a high
intelligence should be prepared for, and then have, a secondary education, since
many handicapped persons are likely to overcome their permanent handicap best
in a career which makes greater demands on their brains than on their bodies.
If craft training is chosen, the child should go to a school to train for a craft which
he will be able to practice in his native town when his schooldays are over.

It may not be possible to answer all these four questions satisfactorily before
admission, especially in the case of a young child. In some cases it may be desirable
to make the first year or so in the residential school probationary and transfer to
another school later if the first is unsuitable. Such further uprooting is, however,
generally undesirable, and the practitioner should make every effort to ensure that
the first choice is as accurate and well-founded as possible.

THE MEDICAL CARE OF THE CHILD IN THE SCHOOL

Few residential schools for handicapped children have whole-time medical officers.
The common practice is to engage a local private practitioner to give general super-
vision and medical care and to have visiting physicians and surgeons of consultant
status to carry out the special treatment appropriate to the defects with which the
school deals. The task of the practitioner who serves as part-time medical officer
is an unusual and difficult one, entirely different from the private practice which
absorbs the greater part of his time. The actual treatment of major or minor acute
illness in the children is, of course, much the same within or without the school,
but the medical officer who contents himself with this falls short of his whole duty.

It is fundamentally important that he should identify himself with the school and its aims. He should keep in constant touch with the staff and the general work of the school, as well as with the consulting physicians and surgeons. In particular he should make real and direct contact with the children in their daily life and should be accepted by all of them as one of a harmonious family. In private practice the confidence of the child's parents is the most important thing; in the residential school it is the confidence of the child which must be sought and won.

Some of the medical officer's work will be unfamiliar. This part will include those minor maladies which, in normal children, are treated at the school clinic. The school will possess one or more competent nurses who can deal with the current daily treatment of these conditions, but it will be for the medical officer to diagnose and prescribe and also to decide whether or not a child should be isolated to prevent infection. Such infective conditions as impetigo, ringworm and scabies are uncommon in a school in which the general management and care of the children is good, but they can, and do, occur even in the best schools and when they do appear may spread like wildfire. The staff should be instructed to watch for them carefully and to notify the medical officer as soon as they are suspected, and he would be well advised to err on the side of caution and isolate every patient in whom there is reasonable ground for suspicion until the condition is proved non-infective.

Medical examinations.—Another unfamiliar task will be the periodical medical inspections of the children. If the medical officer has established the right sort of contact with the staff and children it is probable that many defects will be reported to him before and between inspections, but the need for the periodical inspection will not be eliminated. Since the child is already handicapped it is essential that further handicapping defects should be prevented from developing and the inspections should be made as thorough as possible in order to discover, at the earliest stage, any tendency to further defects. Apart from examination of the heart, lungs, mouth and pharynx, attention should be given to the child's posture, to deformities and defects of the feet and legs, such as knock-knee, flat foot and hammer-toe and to the special sense organs (including the examination of the ears with an otoscope). If there is no arrangement for periodical dental inspection, it will be the task of the medical officer to detect incipient caries and dental irregularities.

Periodical medical inspection should always be carried out in the presence of the child's class teacher and one of the school's nurses and information regarding his physical and academic progress should be available. Any defect or shortcoming should be fully discussed at the time of inspection. With certain defects and with certain children the child may be allowed to stay in the room while his condition is being discussed and should be taken as fully as possible into the confidence of medical officer and teacher. The handicapped child is already acutely aware of his handicap and to feel that there is something mysterious about what is wrong with him, which is only spoken of behind his back, will further reduce his confidence in himself. (There are, of course, cases in which this frankness would be misplaced and should be avoided, but in general the child welcomes reassurance and is eager to cooperate in curing himself.)

Control of infection.—The control of infective disease within the school is of considerable importance. It is now becoming customary to require that before admission to a residential school children should be both vaccinated and im-

munized against diphtheria. Whilst the former might be dispensed with, the latter should certainly be insisted upon. Unfortunately, *diphtheria immunization* is not always controlled by a subsequent Schick test, so that possibly 10 per cent. of those immunized are not genuinely immune and may, in fact, prove a source of trouble by giving the staff of the school a false sense of security. The medical officer of the school should therefore not only inquire if the child has been immunized but should carry out a Schick test on every new pupil or member of the staff and, if the test is positive, should carry out immunization and check the result by a subsequent Schick test. Immunization against other acute specific fevers is more complicated and less reliable. Its value in *whooping-cough* is considerable, but most children entering a residential school will be past the age at which that disease shows its maximum incidence and danger. Immunization against *scarlet fever* can hardly be recommended at present as a routine procedure in residential schools, whilst *measles prophylaxis* is best carried out by the attenuation of an actual attack and is, in any event, rarely necessary after the age of seven, as most children have had an attack of the disease by that age.

The following practical points may be mentioned in respect of the detection and control of infective disease in schools of this type:—

(1) Isolation of a child should never be deferred until a final diagnosis is made. It is better to err in the opposite direction and isolate every child who has a rash or who is showing the prodromal symptoms of any disease from which he has never suffered. *It should be remembered, as a first principle, that many handicapped children have a lowered resistance to disease and that even the more robust cannot afford the interruption to their education which illness may cause.*

(2) The medical officer of the school should arrange for the services, when necessary, of a member of the staff of the local Public Health Department or Isolation Hospital to act as a consultant in suspected cases of infective disease. If, as commonly happens, isolation accommodation at the school is limited, the local isolation hospital should be asked to accept suspected cases for isolation pending the confirmation of the diagnosis.

(3) The medical officer should especially bear in mind the fallacies of the throat swab in the diagnosis of diphtheria. A negative swab may be obtained from an undoubted case; conversely, a positive swab, of avirulent organisms, may be obtained from a normal child, especially if he has been immunized. The routine swabbing of throats in all children after the occurrence of a single case may lead to most deceptive results and should only be undertaken in consultation with the local medical officer of health or hospital superintendent.

GENERAL AND ENVIRONMENTAL FACTORS

The ordinary non-infective illnesses from which children in a residential school may suffer will fall into two groups, exacerbations or complications of the special defect for which they were admitted and illnesses arising independently of that defect. In the former group the medical officer will work in cooperation with the appropriate consultant, whilst in the latter he will be alert for any effect which the illness may have upon the special defect. One of the functions of the residential school is to provide an environment which will protect the handicapped child against the risk of intercurrent illness, and in practice the general health of these children in residential schools is good. Before their admission, however, their

defects and the special circumstances of their lives, which are likely to restrict their exercise and·their access to fresh air, will have lowered their general resistance, and the psychological trauma of their removal will also make them more susceptible to illness. The newly admitted child should therefore be specially watched and, if necessary, his admission to the full activities of the school should be by carefully graduated stages. Conditions of primarily psychological origin are especially liable to occur soon after admission, bed-wetting being prominent by reason of its out-standingly unpleasant features. It is highly desirable that the medical officer should have available the services of a child guidance clinic to assist, when necessary, in obtaining psychological adjustment.

The medical officer of the school will have certain responsibilities in respect of its general hygiene and the diet of the children. The general hygiene presents little difficulty; the Ministry of Health and the Ministry of Education lay down certain standards and the school must have complied with these requirements before it was ˙allowed to receive pupils. In case of doubt the local medical officer of health and his staff will always be ready to give both advice and practical help.

The problem of *diet* is, however, somewhat more complex. The basic diet of the school will have to cater for the needs of children who were under-fed or improperly fed before admission and of those whose general resistance is below normal. Its most important features will therefore be an adequate content of first-class protein and ample supplies of vitamin-containing foods. Vitamin supplements are desir-able, at least during the winter months, in the form of cod-liver oil and fruit or ascorbic acid tablets. Although the risk of destroying the vitamin C content of vegetables by careless cooking and serving ought to be well known there is no doubt that institutional kitchens often fail to practice proper methods. Institutions also tend to provide too little variety in their diets. Large-scale catering is easier if variety is limited but monotony is the enemy of appetite, and the kitchen should at least possess a large enough repertoire to ensure that no particular dinner menu should recur within a fortnight of its last appearance. In particular, the association of a certain dish with a certain day is an unforgivable offence. The basic diet will need to be varied for particular children in accordance with permanent or tempo-rary needs. In a school which admits children with different types of defect, special diets may be needed for special groups of children. It is worth repeating that one need is for the constant reassurance of the child that he is healthy, and when a modification of, or addition to, the diet can obviate the giving of medicine that method should be tried first.

CONCLUSION

Such an article as this is necessarily incomplete and must suffer from both omissions and undue compressions. It does not pretend to do more than give an outline of principles, and the practitioner who is concerned with either the selection of children for residential schools or their care in those schools will doubtless find in it suggestions of the directions in which further knowledge must be·sought. The basic principle which underlies both branches of the work is the ultimate need for the completest possible rehabilitation of the child and his re-settlement within the ordinary framework of social life. The measure of success in selection and care is the basis of the child's adult career, and, although the question "What manner of man will this boy become?" is difficult to answer it must always be present in the mind of the practitioner on whom these responsibilities rest.

NOTES AND QUERIES

DIASONE IN TUBERCULOSIS

QUESTION.—Having got somewhat out of touch with recent advances in medicine, I am wondering if you could enlighten me regarding the use of diasone in tuberculosis? Please give me references to the literature and state whether or not the drug is available for general use.

REPLY.—Diasone is not yet available for general use. It was synthesized in the U.S.A. in 1938 and experiments on tuberculous guinea-pigs have shown that whilst it is less lethal to the bacillus than other sulphones it has the advantage of being less lethal to treated animals. The only considerable experiment on its use in patients is that reported by Petter and Prenzlau in "The American Review of Tuberculosis" of April 1944. They tried it on forty-four unselected cases of pulmonary tuberculosis and it was believed to produce definite improvement as shown by X-ray, sputum conversion, sedimentation rates and general condition. They claim that 59 per cent. of these cases showed sputum conversion by the end of some five months' treatment and that all five "minimal" cases, seventeen of twenty-five moderately advanced cases, and five of fourteen far advanced cases, become sputum-negative or sputum-free by the end of their courses of treatment. They cannot of course give any survival rates comparable with post-sanatorium treatment results.

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WASP STINGS AND ALLERGY

QUESTION.—A patient of mine, aged sixty-eight, was stung seven years ago by a queen wasp, just above the ankle. Within three minutes he collapsed and his wife could not detect any action of the heart. He was thought by everyone to be dead. He came round some two hours later and for an hour or so could do nothing but exclaim every minute or so, "I've been stung by a wasp." Then, by degrees, he recovered. He seems to have been stung directly into a vein. Two-and-a-half years later he was stung on the arm by a wasp, again apparently into a vein. He had time to pick up his tools and go on to his next job some 100 yards or so away (three minutes). Then he collapsed and was unconscious for an hour or more. Last year he was stung by several wasps. He managed to reach a house in a minute or two, then became unconscious. This time he foamed at the mouth and was unconscious for about an hour. Last week he was stung on the neck whilst picking beans —possibly by a bee. He had time to remove his teeth as he went indoors; then he became unconscious. This time he frothed at the mouth and had a fit. He vomited and passed urine whilst unconscious, but the unconsciousness lasted for a shorter time than previously. When he recovered he found himself shaking so much he could not hold a cup. On the first occasion his face became seriously swollen and red, and his ankle turned black. There is always much local œdema which lasts for some three to seven days. Until the occasion seven years ago he had often been stung and had never had any reaction to stings. Is there any way in which he can be immunized against wasp stings?

REPLY.—The immediate allergic reactions to insect stings mentioned are due commonly to a sensitivity to the insect concerned or, occasionally, to the introduction into the patient of some substance on which the insect has been feeding (pollen) and to which the patient is hypersensitive. If due entirely to the insect it may be caused either by the wasp antigen or the venom. Evidence is accumulating that there is some common antigen present in insects, and a person who reacts to wasp stings is quite likely to react similarly to hornets, bees, yellow jackets and ants. A course of injections of a whole bee extract appears to protect against the stings of all these insects. A wasp or bee extract can be obtained from Messrs. C. L. Bencard, Gorgate Hall, Dereham, Norfolk. Two small ¼-inch scratches are made on the patient's skin, some of the insect extract placed on one, and some normal saline on the other, and both are inspected in twenty minutes. If a positive reaction is obtained the patient is highly sensitive and attempts at desensitization must be started with a very weak solution. If no appreciable reaction is obtained then no more than 1/20 c.cm. of the insect extract should be injected intradermally and the size of the reaction noted in ten minutes. The size of the reaction (covered by a sixpence, shilling, a florin or larger) should be mentioned when ordering the desensitizing solution, and all injections should be given combined with a few minims of 1/1000 adrenaline solution.

GEORGE BRAY, M.B., CH.M., M.R.C.P.

PRACTICAL NOTES

A SIMPLE TEST FOR NOCTURNAL HÆMOGLOBINURIA

IN the absence of hæmoglobinuria the differentiation of nocturnal hæmoglobinuria (also known as Marchiafava's anæmia) from other forms of chronic hæmolytic anæmia may be difficult. Swiss workers (R. Hegglin and C. Maier: *American Journal of Medical Sciences*, May, 1944, **207**, 624) have propounded a simple test which they claim to be specific for the disease. Blood is obtained by means of a dry-air sterilized syringe, and 5 c.cm. are placed in a test tube in an incubator at a temperature of 37° C. for six to twenty-four hours. If hæmolysis is present to naked eye observation after six hours, this is diagnostic of the condition. Hæmolysis is considerably increased if the blood is shaken from time to time in the incubator. A qualitative estimation of the degree of hæmolysis is not necessary, and a point that is stressed is that there is no correlation between the degree of hæmolysis and the phase or stage of the disease. As controls, fifty normal individuals, seven cases of microcytic anæmia and twelve of pernicious anæmia, were investigated, and in none was there any increase of hæmolysis as a result of heating.

THE USE OF QUININE IODOBISMUTH IN TYPHOID FEVER

THE successful use of injections of quinine iodobismuth in two cases of typhoid fever is recorded by V. Sacristán Terradillos (*Revista Clínica Española*, April 15, 1944, **13**, 35). In the first case, a woman of seventy-one years, quinine iodobismuth therapy was instituted on the fifth day of illness, after laboratory investigations had confirmed the diagnosis of typhoid fever. The drug was given in dosage of one ampoule of 3 c.cm., intramuscularly, every third day. After the first injection there was marked improvement in the symptoms and the temperature fell, although bradycardia and splenomegaly persisted for five to six days. In all, this patient received five injections each of 3 c.cm. No other medication was given, apart from pyramidon in the first days of the illness before the positive laboratory report was obtained. In the second case, a girl of nine years, granddaughter of the first patient and living with her, the symptoms were similar on admission, so that a laboratory report was not waited for. Quinine iodobismuth was given in dosage of 2 c.cm. every fourth day: it was intended to give four injections, but the fourth proved to be unnecessary, no doubt owing to the early institution of the treatment. Other authors, including D. Camps of Barcelona, have recorded good results obtained by the use of quinine iodobismuth in typhoid fever.

SULPHADIAZINE IN THE TREATMENT OF INFANTILE DIARRHŒA

TWENTY infants, of ages ranging from two to thirty months, with severe or moderate diarrhœa, were treated with sulphadiazine by F. J Menchaca (*American Journal of Diseases of Children*, July, 1944, **68**, 5). In twelve of the cases there was marked dehydration. The method of treatment was as follows:—Injections of isotonic solution of sodium chloride with dextrose were given, and isotonic solution of three chlorides with 3 per cent. dextrimaltose by mouth. The diet consisted of either buttermilk with dextrimaltose or human milk. No anti-diarrhœics were employed, and plasma was given in only two cases. The sulphadiazine was administered by mouth, as the sodium salt for injection was not available, in total dosage of 0·1 to 0·15 gm. per kgm. body weight, divided into four doses six hours apart. All the patients recovered, the average recovery time being approximately six days. Examination of the stools, which in some cases became grey, showed that dysentery bacilli and salmonella were absent. No signs of intolerance to the drug were noted.

SODIUM CHLORIDE IN THE TREATMENT OF THE COMMON COLD

ON the basis of the theory that the distressing symptoms of coryza are due in part to physiological disturbance which results in excessive exudation following the engorgement of the nasal mucosa, the use of sodium chloride by mouth, to promote the withdrawal of fluids from the cells of the nasal mucosa and thereby to decrease the secretion from the glands and mucous membrane of the nose, is advocated by H. Adler (*New York State Journal of Medicine*, August 15, 1944, **44**, 1797), who reports on the results of this treatment carried out in a series of patients. A daily dose of 1 ounce of a saturated solution, approximately 10 gm. of salt, is given for three days; but to obtain the best results the patient, regardless of some epigastric distress of short duration, should take a second dose ten to twelve hours after the first, a third dose in twenty-four hours and a fourth in forty-eight hours. Patients noted that they could breathe more easily through the nose within one hour of ingestion of the salt, and there was marked decrease in secretion with clearing of the head, decrease in sneezing and nose-blowing and in general malaise. It was observed that in patients who failed to take a second dose after the initial

improvement there was a recurrence in three days. A review of the records of the hospital of the Elmire Reformatory, New York, during the years 1940–43, showed a marked decrease in the number of patients hospitalized, which was routinely carried out when a patient had an oral temperature of 100° F. or more. The percentage of patients hospitalized who were receiving the salt treatment was 1·9 per cent. (average stay 2·9 days) for the whole period, compared with a percentage of 6·9 per cent. (average stay 3·69 days) for patients treated by standard methods. In a group of twenty-seven men treated with the salt therapy between March 2 and April 2, 1943, the period of illness was twenty-four hours or less, and in no case was bed rest indicated within the five-day period after treatment was instituted. Sodium chloride in dosage of 8 gm. was also given to children with excellent results and no untoward reactions. Certain points must be borne in mind:— (1) The treatment must be instituted in the early stage of the cold. (2) Some patients have sensitive gastric mucosa, and the treatment may cause nausea, epigastric distress and, at times, vomiting. Gastric reactions are less likely to occur, however, if the sodium chloride is taken one to two hours after meals. (3) Severe thirst follows the ingestion of salt, but only small amounts of water partially to quench the thirst should be taken. (4) The treatment is not recommended for patients who have frequent gastric disturbances. (5) During the treatment period, the diet should be "soft."

STAINLESS IODINE: BACTERIOSTATIC DETERMINATION

WITH the object of testing the bacteriostatic activity of "tincture of iodides" N.F.VII (stainless iodine), generally considered not to possess the therapeutic virtues of iodine, R. M. Jackson and T. D. Rowe (*J. Amer. Pharm. Ass.*, 1944, **33**, 188) have carried out investigations on mice, the results of which are briefly recorded in *The Pharmaceutical Journal*, October 14, 1944, **153**, 158. The experiments also served to test the value of sodium iodate, as ammonium iodate, which is generally considered to be one of the end-products formed from tincture of iodides, was not available. Areas of skin of mice were shaved and a suspension of *Strep. hæmolyticus* was gently massaged in, and then the whole area painted with the solution, i.e., iodine 50 gm., potassium iodide 25 gm., strong solution of ammonia 100 c.cm., water 400 c.cm., and alcohol to 1000 c.cm. After three minutes the treated area was excised, placed inside the peritoneal cavity and the incision closed. It was found that 86 per cent. of the treated animals were protected for seventy-two hours by the use of the tincture, thus indicating a definite

bacteriostatic action. Fifty mice used as controls showed a 100 per cent. mortality in three days. Further, it was found that 75 per cent. of mice treated with a saturated aqueous solution of sodium iodate were alive at the end of seven days, whereas in a control group treated with 45 per cent. alcohol only 32 per cent. were still living at the end of this period. This second finding showed that the bacteriostatic action of the tincture of iodides for *Strep. hæmolyticus*, as tested on the skin of mice, was not primarily due to the alcohol content of the tincture. The bacterial culture used for the experiment was pathogenic for mice and contained organisms which may be present in human wounds.

CARBON DIOXIDE INHALATION IN THE MANAGEMENT OF COUGH

THE value of inhalation of carbon dioxide for the production of effective expectoration in pulmonary tuberculosis is recorded by A. L. Banyai and A. V. Cadden (*British Journal of Tuberculosis*, October 1944, **38**, 111), who report on the results obtained in forty cases under observation. A tank, containing a mixture of 10 per cent. carbon dioxide and 90 per cent. oxygen, mounted on a small platform with casters for use at the bedside, was used, an oxymeter being employed for regulation of flow of gas per minute. The inhaler, to which a small rubber bag is attached, is connected to the tank by rubber tubing. Two methods of inhalation were employed—the closed and open. For the closed method a B.L.B. mask was used (initially an ordinary general anæsthesia mask) and for the open method a glass tube, held to the patient's mouth. The open method, in which admixture of air and dilution of carbon dioxide takes place, is recommended for severely debilitated patients or those showing side-effects of the closed method. The closed method is administered by a nurse, the meter being set to 4 to 5 litres per minute; in rare instances it may be necessary to reduce the flow to less than 4 litres. After proper instructions, the open method can be administered without constant supervision, although the nurse is responsible for the regulation of flow and the time of treatment. The length of each treatment varies from five to fifteen minutes, the inhalations being given once, twice or thrice daily to begin with. During the first treatment the patient must be watched closely, and if the inspirations become too strenuous the inhalation should be given with brief one-minute interruptions. Depending upon the relief obtained, the frequency of inhalations is subsequently reduced, in some cases a weekly or ten-day interval being possible, whereas in others daily inhalations may be necessary for some time. It is claimed that, in addition to the liquefying action of carbon

dioxide, there is a stimulating action on the respiratory centre, resulting in increased expiratory expansion of the thorax, with stretching and dilatation of the bronchi and increased bronchial peristalsis. In the observed series the inhalations were well tolerated, provided the amount of gas inhaled and the timing of inhalations were adapted to the individual requirements. Minor side-effects in the form of hot sensations, frontal headache and slight dizziness, palpitation and weakness were noted in some cases but, with proper adjustment in the method of 'administration, these symptoms did not interfere with the treatment.

MULTIPLE FURUNCULOSIS TREATED WITH PENICILLIN

A DETAILED report of six cases of multiple furunculosis in children of ages ranging from six months to three years is given by Rose Coleman and W. Sako (*Journal of the American Medical Association*, October 14, 1944, **126**, 427). In three of the cases the furunculosis had failed to respond to local treatment and sulphonamide therapy, but the response to penicillin was almost dramatic. In one case, a boy of one year, an initial dose of 20,000 units of penicillin was given intramuscularly, followed by 10,000 units three-hourly for six days, the total dose being 440,000 units. Improvement was noted within twenty-four hours of the beginning of treatment, and seven days after the institution of penicillin therapy the child was discharged completely cured. In another case, a girl of ten months who had been treated with saline packs, sulphathiazole ointment and staphylococcus vaccine, penicillin was given in dosage of 5,000 units three-hourly, by the intramuscular route—total dose 200,000 units. After four days' treatment the furuncles had absorbed and completely disappeared. A third case is of interest in that the child, a girl of nine months, was ill with bronchopneumonia in addition to furunculosis.˝ The temperature on admission to hospital was 103° F. per rectum, and X-rays showed bronchopneumonic patches in the right lung. An initial dose of 10,000 units penicillin was given intramuscularly on the second hospital day, followed by three-hourly injections of 10,000 up to a total of 480,000 units. In four days the temperature was normal, and the furuncles and pustules were completely healed on the fifth day of treatment.

GROWTH-PROMOTING SUBSTANCE IN THE TREATMENT OF INDOLENT LESIONS

USING a stable, dry preparation of powdered adult sheep's heart muscle, which has been proved to possess the property of stimulating cell growth, Lieut.-Col. A. B. Kerr and Lieut. H. Werner (*British Journal of Surgery*, October 1944, **32**, 281) have treated a series of thirty-six cases of indolent wounds, which had failed to respond to other orthodox méthods. The series included ulcers with, or without, preceding trauma or acute inflammation, wounds by projectiles, and burns, and in over 90 per cent complete healing was obtained. The method employed was as follows:—Dressings were carried out daily or on alternate days, the wounds being gently cleaned with saline, lightly sprinkled with heart extract powder, and then covered with gauze soaked in saline or lightly impregnated with petroleum jelly. To note the progress, the outlines of the wounds were traced on sterile cellophane and their area measured with a planimeter. In a case of ulcer of the upper leg on the scar of a recent burn, the ulcer had been treated for eighty-two days with eusol, sulphanilamide, saline baths and sodium sulphate without success, and on admission to hospital the area measured 39 sq. cm. with much undermined edges. Complete healing was obtained after sixty days' treatment with heart muscle extract, the undermined edges being excised at a late stage. Further observations carried out by the authors in relation to the use of the treatment in conjunction with skin-grafting, indicate that preliminary treatment with powdered heart muscle improves the take of transplants.

THE DEODORIZING PROPERTY OF CHARCOAL WOOL FILTER CLOTH

THE use of wool cloth impregnated with activated charcoal dust to control the odour of wounds treated by the closed plaster method is reported by J. M. Regan and M: S. Henderson (*Proceedings of the Staff Meetings of the Mayo Clinic*, May 31, 1944, **19**, 268). The manufacture of "Filter Cloth (Medical)" was the result of investigations carried out by Seddon and Florey, after attempts to incorporate the activated charcoal in the plaster (*Lancet*, June 27, 1942, **1**, 755), which proved messy and unsuccessful. The use of the deodorant cloth on the extremities in the form of a sock completely covering the plaster case, with a draw-string at the end to facilitate easy removal for inspection, is advocated. The material remains effective for from two to five weeks, depending upon the amount of discharge present. It can be reactivated by steam sterilization and wetting does not destroy its deodorizing action when dry. In the report from the Mayo Clinic it is stated that a decreased or completely eliminated odour was noted after the application of the cloth, and ambulatory patients could be seen without any embarrassment because of the odour. A considerable lessening of the odour from infected cutaneous ulcerations with marked drainage is also reported from the Section on Dermatology and Syphilology, where the cloth has been used as a covering for dressings.

REVIEWS OF BOOKS

The Surgery of Abdominal Trauma. By GEOFFREY E. PARKER, M.B., B.CH., F.R.C.S. London: J. & A. Churchill Ltd., 1944. Pp. viii and 120. Illustrations 10. Price 10s. 6d.

At the beginning of the present war there was an idea, derived from the Spanish civil war, that modern missiles and explosives had rendered abdominal surgery so unrewarding as to be hardly worth while. Gordon-Taylor's collected cases from the aerial bombardment of England were the first real correctives of this view. Subsequently, in the Western Desert and North Africa, British and Allied surgeons showed that abdominal surgery might, with the correct use of blood transfusion and other modern technical means, be as fruitful as any branch of traumatic surgery. The articles of Giblin and of Ogilvie were especially noteworthy. Mr. Parker's monograph is in the same tradition. He carefully analyses with full case notes ninety-four abdominal cases personally treated. A recovery rate of 66 per cent. is an index of the success of his treatment. But perhaps even of greater merit is the fact that, almost literally in the heat of battle, the author has found time to record and analyse his cases so carefully. This small monograph can be read with profit by all surgeons likely to be called upon to deal with the abdominal injuries of war and is a credit to the author and to British surgery.

A Guide for the Tuberculous Patient. By G. S. ERWIN, M.D. London: William Heinemann (Medical Books) Ltd., 1944. Pp. viii and 115. Price 3s. 6d.

THIS book has been specifically written for the layman, the need of whose cooperation in the treatment and control of tuberculosis is stressed by the author in his preface. Unfortunately the tuberculous patient is compelled to know much about his illness, but no one should know better than the author how much knowledge is necessary for successful cooperation. Some of the general rules of hygiene might be observed with advantage by those fortunate enough not to be included in the category of the tuberculous.

Pathology and Therapy of Rheumatic Fever. By LEOPOLD LICHTWITZ, M.D. Foreword by WILLIAM J. MALONEY, M.D., LL.D., F.R.S.Ed. London: William Heinemann (Medical Books) Ltd., 1944. Pp. 211. Price 21s.

PROFESSOR LICHTWITZ, whose untimely death early this year shortly after this book was completed meant such a great loss to pathology, had devoted a lifetime to the study of rheumatic fever, and in this work he reaffirms his faith in the allergic basis of rheumatism. Unfortunately, in his attempt to be comprehensive, he has failed to be sufficiently selective, with the result that his exposition lacks that clarity of thought that characterized his previous publications. In addition, he does not differentiate clearly between rheumatic fever on the one hand and, on the other, the various conditions classified under the rather vague title of "rheumatism," such as rheumatoid arthritis. The result is a mass of information culled from the literature of two continents, which will be of much interest to those who are already well informed on the subject, but of little use to the novice. Had he shown more discrimination and concentrated upon the essential features of rheumatic fever, including his own favourite theory as to its causation, he would have produced a much more useful manual and one that is sadly lacking at the moment. As an example of the incompleteness of his survey may be mentioned the fact that in discussing the etiology of rheumatic fever there is no mention of the work done at the Lister Institute on the virus causation of the disease; whilst the lack of balance is well illustrated by the fact that the chapter on rheumatic manifestations in the skin is as long as the one on rheumatic heart disease and has 48 references, compared with only 28 appended to the latter. In spite of the book's shortcomings, experienced rheumatologists will find much to interest them in its pages.

Varicose Veins, Hæmorrhoids and Other Conditions. Their Treatment by Injection. By R. ROWDEN FOOTE, M.R.C.S., L.R.C.P., D.R.C.O.G. London: H. K. Lewis & Co. Ltd., 1944. Pp. viii and 119. Figures 54. Price 12s. 6d

THIS well-produced and well-illustrated little book gives a clear and well-written account of the indications for, the technique of, and the results which may be expected from, injection treatment of varicose veins and hæmorrhoids. The views and methods of the author reflect in general those of standard present-day practice. As notable exceptions, however, he holds that in varicose veins pure injection treatment has a bigger place than many who use ligature combined with injection as their main mode of attack would be prepared to allow; and many would regard his views on the results of injection treatment of piles as too optimistic. In the latter part of the book the author's strong advocacy of injection treatment of hydrocele

would have had more weight if it had contained a well-documented personal series of cases, and he does not mention the use of procaine combined with the sclerosing fluid to prevent the severe pain and shock which he, like others, has found to occur from time to time. The references to injection treatment of bursæ and ganglia would also have been more valuable if supported by personal results.

An Introduction to Physical Methods of Treatment in Psychiatry. By WILLIAM SARGANT, M.B., M.R.C.P., D.P.M., and ELIOT SLATER, M.D., M.R.C.P., D.P.M. Edinburgh: E. & S. Livingstone Ltd., 1944. Pp. xii and 171. Price 8s. 6d.
No one who has read this book can suppose that a psychiatrist can safely be ignorant of general medicine. The variety of physical methods used in psychiatry is manifest in the chapter headings. After "insulin treatment" and "convulsion therapy," come "the treatment of cerebral dysrhythmia," "chemical sedation and stimulation," "continuous sleep," "some special uses of intravenous barbiturates" and "diet, vitamins and endocrines." Then there is a temperate chapter on prefrontal leucotomy, and another on the malarial treatment of general paralysis. A concluding essay on the relation of psychological to somatic treatment puts the physical methods in perspective—not entirely successfully, as the authors evidently practise psychological treatment with less enthusiasm than they feel when more material methods are being employed. This bias gives their book a faintly evangelistic tone which testifies not only to their therapeutic "drive" but to the greater attraction which non-psychological methods of treatment have for most medical men, not excluding psychiatrists.

Branch Street. By MARIE PANETH. London: Allen and Unwin Ltd., 1944. Pp. 128. Price 6s.
THIS is a vivid and uncomfortable account of how some children live and behave in one of London's slum streets, on the border of one of the big prostitute quarters. It illustrates, only too pathetically, how much of their aggressiveness and unruly behaviour can be traced to their unfortunate homes, but also how an unsatisfied demand for knowledge on details of sex matters can radically affect a child's behaviour. The author showed great courage in handling a situation which might well have daunted, although it would undoubtedly have interested, a psychiatrist.

Studies on Immunization. Second Series. By SIR ALMROTH WRIGHT, M.D., F.R.S. London: William Heinemann (Medical Books) Ltd., 1944. Pp. 256. Price 25s.
THIS is the fourth volume of the Series of Collected Researches from the Inoculation Department of St. Mary's Hospital. Their range is co-extensive with the distinguished author's unique experience in the world of bacteriology. The nine articles reprinted in this volume, starting with a paper on "Vaccine Therapy: Its Administration, Value, and Limitations," read before the Royal Society of Medicine in 1910, includes all his major contributions on the subject of immunity from this date down to the paper, "On the Need for Abandoning Much in Immunology that has been regarded as Assured," read before the same Society in 1941. In addition, four articles are included as appendices. Compiled from a vantage point that surveys over half a century's service to the science of bacteriology, these volumes of collected researches provide a running commentary on every aspect of bacteriology that is as outstanding for its scope as it is for its originality. They provide a contribution to the subject that will for long occupy an honoured niche in the annals of medicine, and it cannot be doubted that their perusal will for many generations to come form an integral part of the education of all young bacteriologists.

Health and Social Welfare, 1944-45. Advisory Editor, The Rt. Hon. LORD HORDER. London and New York: Todd Publishing Company Ltd., 1944. Pp. 336. Price 21s.
THIS is apparently the first appearance of an annual reference book, and all workers in social welfare, especially in its medical aspects, will be grateful for the large amount of information which it contains. From Beveridge to the British Medical Association its range is wide, and short monographs give an account of various aspects of the health services, present and to come. It is a little difficult to see why the activities of the chief medical-social worker—the hospital almoner—have not been selected for special comment, nor why, for example, the National Baby Welfare Council has a page and a half whereas the National Council for Maternity and Child Welfare gets one line in a list of "organizations interested in health and social welfare." No doubt these matters of selection may be adjusted from year to year. Meanwhile, a charming portrait of Mr. Willink beams upon the opening article, and thereafter for over three hundred pages, facts and opinions positively

crowd the pages. It is most useful to have this subject included in a series of reference books.

Local Anæsthesia: Brachial Plexus. By R. R. MACINTOSH, M.D., F.R.C.S., D.A., and WILLIAM W. MUSHIN, M.B., B.S., D.A. Oxford: Blackwell Scientific Publications Ltd., 1944. Pp. 56. Figures 33. Price 10s. 6d.

THIS is a small monograph dealing with a limited branch of local anæsthesia, the brachial plexus block for operations on the upper limb. It makes out a fair case for the occasional use of this method, which, however, is never likely to become of great popularity in this country. The anatomy of the brachial plexus is well and accurately described, although some objection might possibly be raised to the use of the external jugular vein as a landmark, on account of its well-known variability. The plates and coloured diagrams are good, but there are undoubtedly too many and they occupy far too much space in the monograph; in fact, more of it is occupied by illustrations than by letter-press. There is also considerable repetition in these pictures, in that many of them repeat the same subject with only the slightest possible variation. The question of possible infection following these punctures is dealt with rather too lightly, for such an accident is occasionally seen, even after simple hypodermic injection. The monograph is readable, and will prove useful to anyone seriously practising this method of analgesia on a large scale. The price (10s. 6d.) is high.

The Nature and Treatment of Mental Disorders. By DOM THOMAS VERNER MOORE, O.S.B., M.D., PH.D. London: William Heinemann (Medical Books) Ltd., 1944. Pp. viii and 312. Price 21s.

THE author of this informative and lucid book is a priest who has been trained both as an academic psychologist and as a psychiatrist. His various studies, among which the use of a statistical method of defining nosological entities has been notable, are here worked into the fabric of a reasoned account of the psychopathology and treatment of the mental disorders, usually classified as psychoneuroses and psychopathic personality. Freudian doctrines are criticized adversely, but without heat; the fairness of Dr. Moore's mind and his conciliatory temper are among the most obvious things in the book. His exposition of controversial matters is not penetrating, but the wide range of types he covers precludes much detail. Case histories, however, are used freely to demonstrate the diverse methods of treatment employed. The religious vocation of the author is often evident in the discussion of these cases, but it is plain that there is little to differentiate the main lines of his clinical practice from those followed by many psychiatrists who are not Roman Catholics. He describes methods of handling those difficulties within the family that may cause psychiatric illness in its members and, under the heading "miscellaneous techniques," sets forth a number of sensible procedures. Two final chapters traverse the physiology of the emotions and the pharmacological treatment of mental disorders.

Medicine and Mankind. By ARNOLD SORSBY, M.D., F.R.C.S. The Thinker's Library, No. 104. London: Watts & Co., 1944. Pp. xii and 116. Illustrations 22. Price 2s. 6d.

OPENING with a brief resumé of the growth of medicine, the author discusses the mechanism of health and disease and the changes wrought in the cells of the body by disease processes. Heredity, in both its recessive and dominant forms, congenital disease and its origin in the period of fertilization of the ovum, and the effects of diet and environment on the health are debated. Two chapters on treatment are included, one devoted to individual and the other to collective measures, and there is an interesting chapter on social achievements and frustrations and their effects on the rates of morbidity and mortality. The book, which is an abridgement of the author's larger work, is well illustrated; there is an index and a useful glossary.

NEW EDITIONS

Textbook of Anæsthetics, by R. J. MINNITT, M.D., D.A., and JOHN GILLIES, M.C., M.B., CH.B., D.A., in its sixth edition (E. & S. Livingstone Ltd., 25s.) appears in a much enlarged form, with numerous additions and alterations and new chapters dealing respectively with trichlorethylene, endotracheal anæsthesia, intravenous anæsthesia and anæsthesia for dentistry. A number of new illustrations contribute to the excellency of the new edition.

CONCENTRATION on the clinical aspects of endocrinology in the preparation of the fifth edition of *Recent Advances in Endocrinology,* by A. T. CAMERON, D.SC., F.R.I.C., F.R.S.C. (J. & A. Churchill Ltd., 18s.) adds greatly to the usefulness of this well-known treatise. Among the new additions are sections on the use of radioactive iodine in the treatment of thyroid dysfunctions and the use of new synthetic hormones. The book is generously illustrated.

NOTES AND PREPARATIONS

NEW PREPARATIONS

PHEMITONE—BOOTS, a barbituric acid derivative (N-methyl-5-phenyl-5-ethylbarbituric acid), has been introduced for the' treatment of epilepsy. It is claimed that the product is practically free from the hypnotic effects associated with phenobarbitone and bromides and that the degree of toxicity is markedly low. PETHIDINE HYDROCHLORIDE—BOOTS, is a synthetic analgesic and spasmolytic, the action of which is stated to be comparable with that of morphine but with a lower narcotic effect, so that it may be used in small dosage for the production of analgesia in ambulatory patients. The manufacturers of both these products are Boots Pure Drug Co. Ltd., Station Street, Nottingham.

VIACUTAN (silver dinaphthylmethane disulphonate) is a new coagulating preparation for the treatment of burns, particularly those involving the hands and face. It is stated to possess a definite anti-bacterial action. The manufacturers of this product have also placed on the market STIMATONE (pholedrine), a circulatory stimulant and restorative, and two sulphonamide derivative preparations, STERAGAN (sulphaguanidine), for the treatment of bacillary dysentery and infections of the intestinal tract, and STERAMIDE (sulphacetamide B.P.C.) for the treatment of infections of the urinary tract and other infective conditions. Full particulars of these preparations can be obtained from the manufacturers, Ward, Blenkinsop & Co. Ltd., Brooklands, Halewood, Liverpool.

THE CASSEL HOSPITAL FOR FUNCTIONAL NERVOUS DISORDERS

THE Medical and General Reports for the year ended December 31, 1943, contain some interesting accounts of new therapeutic measures, the results from which are markedly encouraging. A recovery rate of 77 per cent. has been obtained with electric shock therapy, and good results have followed narco-analysis and prefrontal leucotomy. The value of occupational therapy in rehabilitation is obvious from the reports, copies of which can be obtained from the Secretary, The Cassel Hospital, Ash Hall, Bucknall, Stoke-on-Trent.

TO-MORROW'S CHILDREN

THIS is the title of a monograph issued by the Tory Reform Committee. It deals most adequately with the important subjects not only of means for increasing the birth rate but for the production of healthy children for the next

generation. A copy of the booklet can be prcured, price 1s., from all booksellers; it published by Europa Publications Ltd., 39 Beford Square, London, W.C.1.

MENTAL DEFICIENCY AND ALLIE CONDITIONS

IT is proposed to hold a course of lectures ar clinical instruction for medical practitioners c the above subjects at the London School Hygiene and Tropical Medicine, Keppel Stre London, W.C.1, from March 12 to 23, 194 The fee for the course is £5 15s. 6d., ar applications, accompanied by a registration fe of 10s. 6d., should be made as early as possib to Miss Evelyn Fox, C.B.E., c/o Universi Extension Department, University of Londo 39, Queen Anne Street, London, W.1.

OFFICIAL NOTICES

Supply of Sheets for Expectant Mothers (circul 154/44) has been issued by the Ministry Health to Welfare Authorities, and deals wi the issue of priority dockets for the supply additional sheets to women holding the R.F expectant mother's ration books. It is propos that the issue of such dockets should be by t Welfare Authorities to applicants presenti certificates issued by midwives. An *Inter Report of 'the Inter-Departmental Committee Dentistry* has been issued by the Ministry Health, and is obtainable at H.M. Statione Office, price 6d.

CONTENTS FOR FEBRUARY, 1945

ERRATUM

It is regretted that in error the address of Glaxo Labo tories Ltd. was given as Greenford, Essex, on p. 386 the December issue. It should, of course, have be Greenford, Middlesex.

THE COMMON COLD

By T. B. LAYTON, D.S.O., M.S., F.R.C.S.

Surgeon in charge of Nose and Ear Department, Guy's Hospital; Otologist to Fever Hospitals, London County Council.

THE scene was the family Christmas gathering early in the century. My business uncles were, as usual, trying to pick the brains of the family practitioner. "No! there's no influenza about, but a lot of influenzal colds," said he. "Silly old fool," said I to myself with all the self-confidence of a medical ward clerk, "A cold is a cold, and influenza, influenza." Granted. But, he was not a silly old fool. He was a good subconscious clinical observer. He was one of those who began to sort out the two. He knew that what he was seeing was not what he had been through in 1890–91, but was different from the common cold. And so to-day. Leaving out 1918-19, it is suspected that there are several influenzas, each distinct from the common cold. The pathologists already have one. No doubt some day it will be possible to send a little nasal secretion to the local clinical laboratory from which a report will be sent as to whether it contains a cold or an influenza virus. At present clinical observation must be relied upon for the distinction. That seems the crux of the cold problem. The cold may be a nuisance but is not harmful to those not already damaged. Influenza may be fatal to the strongest and healthiest. The latter lets in the hæmolytic streptococcus or the pneumococcus; the former does not and may even be antipathetic to them. I should never knock a healthy person with a common cold off duty, nor should I with a simple influenza. But if I thought it an influenza I should keep a close eye upon him in case the hæmolytic streptococcus began to ramp within him, and then I should knock him off duty.

DIFFERENTIAL DIAGNOSIS

It is therefore necessary to distinguish between the two conditions. Locally, the common cold is characterized by extreme swelling of the mucous membrane and an inordinate degree of mucus in the discharge. The other symptoms are secondary to these—the impossibility of nasal breathing, the dull heaviness of the head, short of pain, except to those in whom every abnormal stimulus is interpreted as a pain; the deafness from the obstructed tubes; the momentary giddiness as one of these becomes open and air again goes in; the slimy handkerchief that sets solid on drying. Of general symptoms there are none, except perhaps a slight initial malaise. In influenza there is an intensity of injection of the nasal mucosa rather than a swelling. The front end of the septum is the bright vermilion that the children love in their paint boxes. Swelling is not marked. The discharge is thinner, less copious and without much mucus. Over the soft palate and the fauces there is a light injection due to the dilatation of medium-sized vessels rather than to a capillary hyperæmia of the smallest ones. Of general symptoms there may be none.

They may be mild. They may be severe. A malaise with or without a severe headache, and then the ache. This may or may not be accompanied by a tenderness at the insertion of all tendons. As the subject under discussion is the common cold no more need be said about the mild influenzas, except that if there be a hæmorrhagic bleb upon the drumhead or external auditory meatus, it is one of these.

In some the common cold is ushered in by a sneeze, in some by stuffiness, in others by a sensation at the back of the palate which develops into mild pain on swallowing. The cold is then said "to fly to the throat." I used to take out the tonsils of these patients. It did no good. Often it did harm. "He used always to be catching colds, now he is never without one" is a common story when this is done. The lymph tissue of a child's throat is the first line of defence against infection when this is removed the defence is thrown upon the second line, which is the mucous secretion, and a subclinical infection becomes a permanent clinical one. No one to-day should remove a child's tonsils for recurrent colds—nor an adult's for that matter—nor is the mistaken diagnosis from the mild influenzas an excuse for the procedure is as valueless in them as for the common cold. It has been weighed in the balance and found wanting. No further experiments in this matter should be made. It is true that in some children colds cease after the operation and so many of these are performed that the total number of such cessations may be considerable. They would have ceased anyhow. It is remarkable how a child may have cold after cold, winter after winter, for several years and then when the next year comes round they have ceased. If they have their tonsils out the cessation is attributed to the operation. But I am of a generation that did not lose its tonsils, and two out of five of us children had these recurrent colds. Mine ceased suddenly before the age of twelve and I never had another until the late fifties a sister used to be worse, for she had bronchitis with them. They also ceased, and for thirty years as a schoolmistress she never had a day off duty through any illness. This shows that they leave no harm behind.

TREATMENT

Early in November Mr. Middleton introduced his weekly talk on gardening by saying that if he got a cold nearly everyone he met gave him an infallible remedy for it. In medicine it can be certain that when this happens they are not remedies Not that some of them never do any good, for the "remedy" at times may correct some unknown and unrecognized error of metabolism in a few of the many who swallow it. This is perhaps why calcium is sometimes of avail, for of calcium metabolism as little is known as of the common cold.

Purgatives.—My grandfather was an advocate of "the birch-broom and a bucket of water." And so am I. The simile comes from swilling down the stable yard In his day it was a blue pill and a black draught. I like in children some such preparation of rhubarb as "Dr. Gregory's stomachic powder," and in the healthy young adult castor oil. It acts with certainty, it acts within five hours, it acts but twice, and leaves the patient costive for a day or two, which is an advantage until the roughage is replaced. Physicians have done much harm of recent years by preaching against purgatives. They have aimed at moderating the purgative habit; and have knocked out a branch of therapeutics. No young practitioner

nurse to-day uses anything but liquid paraffin. To what extent this may be due the replacement of my grandfather's stable by a garage I cannot say. So great the power of suggestion in members of both professions that I would not exclude but whilst liquid paraffin is often of value as a corrective to alimentary disirmonies of the middle-aged, it is useless for that emptying of the alimentary canal om duodenum to the rectum which is so valuable an initial treatment of most flammations of the upper respiratory tract. To-day, medicine has become so iecialized that it is foreign to general thought that any happening below the aphragm can have any effect upon structures that are above it; but the importance : these disharmonies of the alimentary system, summed up by them in the term livery," upon the respiratory tract, was well recognized by the physicians of the irly part of the last century.

I would not insist upon the emptying of the gut in the worker in the office or top unless the visits to the closet can be synchronized with being at home. The vatory accommodation of the Factory Acts is not up to the standard that might e wished, and young men as well as maidens are shy of "leaving the room" from mixed assembly, whilst the middle-aged man is shyest of all.

Drugs.—I am opposed to the use of aspirin for the common cold. It works like charm for the ache of the influenzas—but even then two tablets should not be iven if one will do the trick, and if two have no effect more should not be given. The habit of heavy self-dosing with aspirin by the laity should be checked by the nedical and nursing professions. Unfortunately, both tend to encourage it. spirin is "lowering," to use another of my grandfather's terms for a condition hat is very real but has been forgotten by the modern physician and not yet ackled by the pathologist. An excessive use of this drug may leave the patient n a much worse state than will any common cold; and, if the cold has really been mild influenza, it is, in my opinion, as well as in that of others, more likely to be ollowed by a suppurative complication in the ears and sinuses than in a case in vhich it has not been used. In addition, it has definitely been shown to be a gastric rritant (Douthwaite and Lintott, 1938).

The use of A.P.C. tablets is lazy therapeutics equally opposed to the canons of science and to those of the empiricism of the great clinicians of the last century, who used it with such success. Someone has thrown together three drugs that may hit off the three commonest symptoms of medical minor ailments—an ache, a pain in the head, and a tickle in the throat or chest. If codeine is indicated let it be given; if there be a headache phenacetin may help the patient to control it. My own favourite is ammonium acetate, perhaps an hereditary liking from my grandfather. It is rapidly oxidized in the body and converted into urea. Its main action is therefore that of a diuretic and this may have a value in removing waste products from the body. Dr. Douthwaite tells me that "it is conceivable that it causes a slight increase of sweat, but faith in its diaphoretic properties has clearly waned." In the same way it may stimulate the respiratory secretion or rather so loosen its adhesion to the lining of the wall that it is easily converted into sputum. But the best drug thus to "cut the phlegm"—as my grandfather used to say—is bicarbonate of soda. This may be taken in teaspoonfuls when the patient likes. The best thing of all, however, for sleep, secretion, and sweat, is "treacle posset"

taken after getting in to bed. My mother used to make it thus:—

Take two parts of milk and one of water, bring them to the boil and stir in to half-a-pi
a dessertspoonful of golden syrup.

In another year it may be possible to return to it. If a teaspoonful of rum
whisky be added I should not object. This, however, must be on the Chestertoni:
principle that you take alcohol because you like it and not because it is good for yo
The medical practitioner must always be on his guard, when ordering or condonii
it in illness, that he is not giving an excuse to "take a little more" to one in who
he should be using his influence to "take a little less." For this reason ai
suggestion of the "top hat and whisky" treatment for a cold, in which the suffer
retires to his bedroom, puts the top hat upon the post at the bottom of the b:
and drinks the whisky until he sees three hats, should be quashed. Others m:
joke at this, the practitioner may not. One person present might, as a result, conv:
the joke into a reality. And yet it is necessary not to appear to be a prude. Perha:
the best way to controvert such a suggestion is to say that you will give r
guarantee that it will cure the cold but you are certain that the consequent pa...
in the head will cause more suffering than the cold itself. It is the same with
regard to fluids. The loss by gut, kidneys, and skin must be replaced and in
addition more is needed and so the patient cannot drink too much; but in saying
this it should be added that the usual ration of alcohol may be taken but no more
that the patient cannot drink too much hot tea, and the rest must be made up with
water, cold or hot. It is important not to give a patient an excuse to lean against
the local bar boasting he does it on "the doctor's orders." Such a one is likely
to develop a habit of colds.

MANAGEMENT OF THE PATIENT

I have already said I would not knock a healthy person off duty with a common
cold; but I would warn him not to burn the candle at both ends, to take that
little bit of care of himself that is found distasteful in the fit, to whom it indicates
a not quite healthy mind. Most healthy persons enjoy an excuse occasionally for
sitting with a book in a dressing-gown before the fire of a Saturday afternoon or
all Sunday. To that position I would relegate all those with any structural defici-
ency, such as a valvular lesion of the heart, however well compensated. It is on such
as these that the common cold bears so heavily. To be laid by the heels for four
days four times a year has absorbed half the holiday time of the fortunate, and
more than all of most. Neither the individual nor the community can afford it
all. I do not believe that keeping an individual away from duty is of any help
to others. It is true that a cold will go round a house, starting from an individual
member of the family. If round the house why not round an office? It may; but
to remove one source of infection, because obvious, will not remove all. Colds
may be subclinical. It is possible that they are infective in an incubation period
I suspect that they may be caught from the individual himself; that is, that he
"harbours" the virus which has no effect until the resistance is lowered, usually
by exposure to cold—hence the name. Such "harbourers" may also be "carriers,
and all these sources of infection may act whether the person with the clinical cold
is removed or not. In recent discussions on infection so much attention has been

~~id to the infecting agent, that the host and the atmosphere in which he lives
ve been somewhat neglected. Adequate food before leaving for work, a proper
ich, not too much standing in queues, will protect the individual; as will also
brisk walk, and he or she is lucky whose home is half a mile from the station
bus stop. Ventilation has suffered a serious set-back in the minds of the
ofession, and both physicians and medical administrators are weakening on the ·
bject. A warm room, well ventilated, is an easy ideal to specify but a hard one to
tain. It is complicated by the fact that so many occupations to-day are unassoci-
ed with muscular activity, especially of the lower limbs. Where such work is in
ogress it is necessary to keep the temperature not warm but hot, for efficiency.
or is "conditioned air" likely to solve the problem. The mucous membrane of
ie nose has been evolved to battle with the elements. To reduce it to a flow of
erpetual sameness is to submit it to a state not physiological.

The "harbourer" is that person who maintains within his body a source of
iflammation potentially harmful to himself at or near the site of its deposition
ither than in distant areas (focal infection hypothesis) or to other human beings
:arrier problem). Herpes (herpes facialis) affords an example; it is specific to
ertain people. It may be the concomitant of a common cold, or of an influenza,
r it may recur from time to time without either of these developing. It seems
s though the eruption from the latent virus of the herpes may prevent the evolution
f the symptoms of the other two. And it may never affect another person living
1 close contact in the same household. Such casual observations add force to
he fact that as yet little is known of the influence of one infecting agent on another,
ir rather of the resistance and reactions of the human being to more than one
nfective agent. It would be well if the pathologists were to turn their attention
or a while to the protective mechanisms of the human body, and take up again
he theory of opsonins from where Sir Almroth Wright left it.

PREVENTION

[f it is possible to give only uncertain positive advice in the treatment of colds,
still less can positive measures be suggested to prevent them. And yet sometimes
advice is given which is so immediately and so strikingly followed by the cessation
of a patient's cold that it is impossible not to feel that there must be some influence
of cause and effect and that it is not merely a matter of sequence.

The late Dr. Poulton introduced to Guy's, and perhaps to London, the prepara-
tion* of the late Mr. Glegg of Leeds, because it had entirely cut short the colds
that used to incapacitate him, if used the moment he felt one coming. I used it
on many patients, but, whilst finding it acted like a charm on those headaches and
other nasal symptoms that follow influenza and are usually labelled "sinusitis,"
I never found one patient in whom it prevented or cut short a cold. And then,
dancing one evening with the relative of a colleague to whom I had suggested it
some four years previously, I was rendered dizzy by her gratitude because she
had never had a cold since and this had changed her life. It is gratitude such as this,
greater than that of those who know they owe their lives to some special surgical
or medical care, that emphasizes how trying to those who suffer from them are
these maladies that are classed among the minor ones.

* Three parts liquid and one part soft white paraffin.

One of my teachers used to say that he was cured of colds by growing a beard another always wore spats in winter. I have never dared to suggest either of these, but they have served to prevent me from mocking at any suggestions made by others. Some claim that smoking is a preventative. Sir Buckstor Browne, with the experience of bygone ages, swears by snuff. One vigorous old lady to whom I advised this borrowed a pinch from her gardener and paid me another fee to come and tell me what she thought of it. I do not think the gardener's snuff was of the best, but am sure that the reason why I ordered it was that she sat with her hand on a stick in the attitude that Irving took up in the *Tale of Waterloo* and needed but the snuff to make the picture complete! Some like menthol others fly to eucalyptus. The two differ in that the former is objectionable to but few who stand around, the latter to many. It is the fashion of the day to try to shrivel up the lining of the nose with ephedrine, with adrenaline, or other drugs I have not used them because it seems to me wrong to try to neutralize what i a physiological reaction. I cannot say I have had better results than others thereby I am certain I have not had worse.

Vaccines.—The only prevention with any claim to science is that of inoculations Some of the earliest work on these was done by a fellow student of mine, R. W Allen. He acted on the assumption that the organisms he found in the nose wer the "cause" of the cold. He published a paper in which he "showed" that it had "cured" colds in three patients "due" to a certain organism. He added footnote that unfortunately they had gone down with worse colds due to other organism. Perhaps this is why subsequent vaccines have been made up many microbes. In 1937, the London County Council kept three such each with six or seven organisms. I do not think that they were extensively by the medical officers to whom they were available. Since it has become generali recognized that the "cause" of the cold is a virus, all this has become empiri again. This is not to say that it is valueless. Many general practitioners swear by them and maintain that success depends upon a strict attention to detail in dosage in spacing, and in the time of year at which the course is given. The thought the enters the doubter's mind is that the details upon which they lay such stress ar different between each practitioner and another, even when they are using same stock vaccine.

A more intense attempt at scientific treatment was the use of autogenous vaccine I have only once known them to have been efficient. This was in the case of New Zealander who was pursuing a bacteriologist around the world because effect of the vaccines he had made for him had worn off, and no other bacteriolog had been able to repeat the success. Since the emphasis has passed from the micro organisms to the virus, autogenous vaccines have entered the realm of empirici from that of science.

In the treatment of the common cold, both therapeutic and preventive, scient has done nothing and empiricism still holds sway. If it be remembered that th involves the care of the patient in every detail of his life, much good and honourab! work may be done by it.

Reference

Douthwaite, A. H., and Lintott, G. A. M. (1938): *Lancet*, 2, 1922.

ACUTE INFECTION OF THE NASAL SINUSES

By J. P. MONKHOUSE, F.R.C.S.

Surgeon, Ear, Nose and Throat Department, Middlesex Hospital.

ACUTE infection of the nasal sinuses is of common occurrence, but with adequate treatment the sinus, if previously normal, may be expected to return to its original state. The prevalence of chronic sinusitis makes it evident that, for one reason or another, the treatment of this disease is not always satisfactory. Sometimes the acute symptoms are not marked and the patient does not seek aid until a persistent and possibly foul discharge convinces him that all is not well; but at other times the fault lies with the medical attendant, who having got his patient over the acute stage is satisfied and fails to make sure that resolution is complete.

ANATOMY

A knowledge of the main features of the anatomy of the nose and sinuses is essential to the proper appreciation of the principles underlying both diagnosis and treatment.
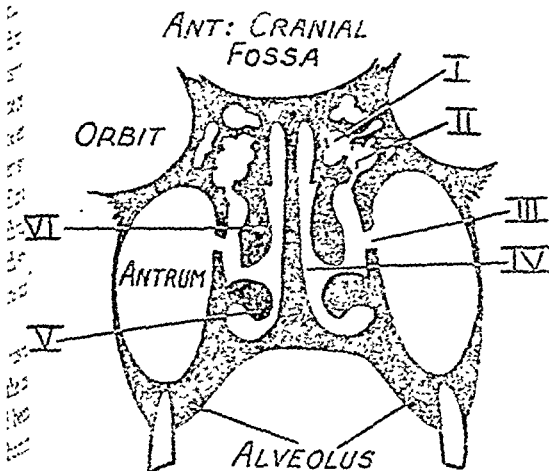
FIG. A : (I) Ethmoidal cells. (II) Ostium of ethmoidal cell. (III) Antral ostium. (IV) Septum. (V) Inferior turbinate. (VI) Middle turbinate

The nasal sinuses may be considered as four in number on each side: the frontal sinus, the maxillary antrum, the ethmoids and the sphenoidal sinus. Of these the *antrum*, which is the largest, lies in the superior maxilla, bounded above by the floor of the orbit, internally by the lower part of the lateral nasal wall, below by the alveolus (where the roots of some of the pre-molar and molar teeth are near the floor and may even project through it) and in front and externally by the cheek (fig. A).

The *frontal sinus* lies in the thickness of the frontal bone, extending upwards and also backwards above the orbit. The posterior wall forms part of the anterior cranial fossa (fig. B (I)). This sinus is variable in size and may be large or absent altogether on one or both sides. This is in contradistinction to the antra, which, though variable in size, are usually equal.

The *ethmoids* are a labyrinth of small cells lying between the inner wall of the

orbit, where the bone is thin, and the upper part of the outer wall of the no[
(fig. A (I)). These cells are divided into anterior, middle and posterior group
there being a distinction between the first two and the latter in regard to th
position of their openings into the nose.

The *sphenoidal sinus* lies in the body of the sphenoidal bone and, as with th
frontal, is variable both in its actual size and in its size in relation to the sin
on the opposite side (fig. B (X)).
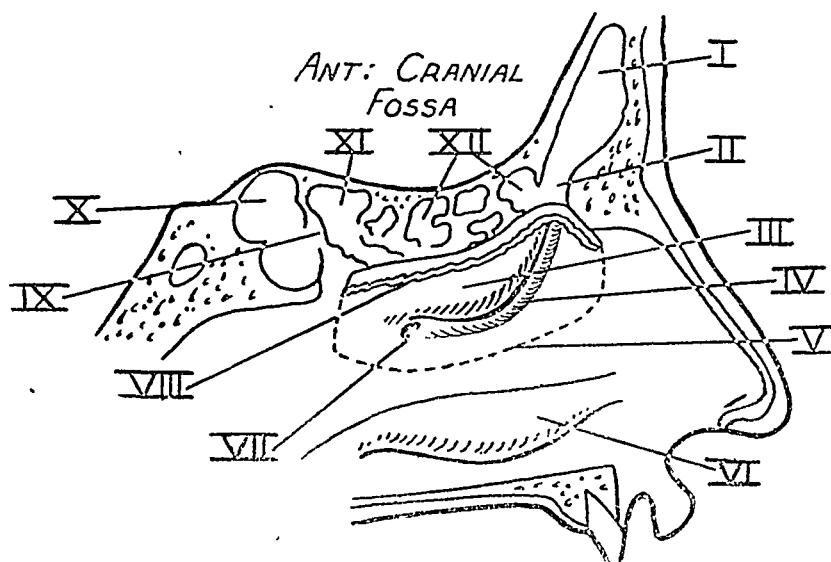
FIG. B : (I) Frontal sinus. (II) Infundibulum. (III) Bulla ethmoidalis. (IV) Hiatus
semilunaris. (V) Free edge of middle turbinate. (VI) Inferior turbinate. (VII) Antral
ostium. (VIII) Cut edge of attachment of middle turbinate. (IX) Sphenoidal
ostium. (X) Sphenoidal sinus. (XI) Posterior ethmoids. (XII) Anterior and
middle ethmoids.

Fig. B shows the outer wall of the nose after the removal of the middle turbinat
a structure which will be considered later.

The frontal sinus opens into the nose by a tube, the infundibulum (fig. B (II)
which comes from the floor of the sinus and runs back into a groove, the hiatu
semilunaris (fig. B (IV)). This is the usual state of affairs, but sometimes th
infundibulum opens into the most anterior cell of the ethmoids and through th
into the nose; whilst at other times it opens deeply into the anterior ethmoids,
that drainage is through several cells and will obviously be more difficult than wit
either of the two more usual arrangements.

Above the hiatus semilunaris is 'a projection, the bulla ethmoidalis, on whic
are the openings of the anterior and middle ethmoids (fig. B (III)); the posteri
ethmoids opening further back, above the attachment of middle turbinate (fig. B (XI)
The opening of the antrum is in the hiatus (fig. B (VII)), although there may b
an accessory opening on the bulla.

The sphenoidal ostium looks forward and is situated practically on the roof (
the most posterior part of the nasal cavity (fig. B (IX)).

The openings of frontal sinus, anterior and middle ethmoids and antrum all lie
der cover of the middle turbinate, which is attached along the line (fig. B (VIII)),
ilst the free lower margin is indicated by the dotted line (fig. B (V)). This
ucture, the anterior view of which is shown in fig. A (VI)), has a bony framework
covered by mucous membrane, which is capable of great
swelling and, coupled with a high deflection of the nasal
septum (fig. C), may bear upon the nasal wall and prevent
drainage from all the sinuses with openings lying in the
middle meatus.

ETIOLOGY AND PATHOLOGY

Acute sinusitis practically always follows a nasal cold,
possibly preceded by influenza. To the initial virus infec-
tion is added a secondary infection, commonly streptococ-
cal, but often by a pneumococcus or Pfeiffer bacillus. It is
probable that the sinuses never escape entirely, since these
cavities are in direct communication with the nose, and
the mucous membrane is continuous throughout the whole
system. At first there is a catarrhal inflammation with
itpouring of mucus or a muco-purulent secretion, but if drainage is not ade-
1ate this will soon become purulent.

G. C.: Showing deflec-
tion of upper part of nasal
septum, with pressure up-
on one middle turbinate
and hypertrophy of the
other.

The sinuses are lined by a ciliated columnar epithelium and the cilia are arranged
) that they all sweep towards the opening of the cavity in question. This mech-
1ism, although it sounds uncertain, is actually most effective, so long as the cilia
ontinue to work. A virulent infection, however, will cause paralysis of ciliary
ction, and then all except an overflow drainage must cease. Gravity might play
small part in the case of the frontal sinus, but cannot assist in clearing the antra
r sphenoids, as in these the openings are high above the floor. Mechanical
bstruction also plays its part. There is swelling of the mucous membrane lining
1e ostia and covering the middle turbinate, and if in addition there is a high
eflection of the septum, the turbinate may be firmly jammed against all the
penings which lie beneath it.

· Antral infection is not always *via* the nose but may be caused by a dental abscess
ursting into the cavity, although more usually it occurs as a result of damage
) the floor on removal of the tooth, an accident which is sometimes unavoidable.
1 this case the infection is often anaerobic, and the pus is foul from the beginning.

CLINICAL EXAMINATION

dequate illumination and some type of nasal speculum are essential. The first
best obtained by the use of a head mirror reflecting the light of an electric light
1lb of medium power. A bedside light or small standard lamp can be found in
ost houses. An electric head lamp is quite satisfactory, but the lamp must be
1all, so that the line of sight may coincide as nearly as possible with the beam
light. Many diagnostic sets contain some form of illuminated nasal speculum

which will suffice. For use with a head mirror or lamp, a Thudicum specul~· is the best.

Post-nasal examination requires a post-nasal mirror and a tongue depress. It is not an easy manœuvre, but it may give valuable information and is wor practising.

DIAGNOSIS

Except in the case of a dental antrum the patient has, or has just had, an upp respiratory infection, and if such is not the case it is quite likely that his symptor are due to another cause, or that the condition is an acute exacerbation of chror disease. The importance of the second possibility lies in the fact that the chan of a straightforward recovery is much less and the likelihood of complicatio much greater.

CLINICAL SIGNS.—The *temperature* is raised, often to 102° or 103° F., ar there may be rigors.

Pain.—According to the degree of drainage there is anything from discomfo to the most acute pain. When the antrum is at fault, pain is most commonly situate in the cheek and upper teeth, and at times it is so much concentrated in the tee that some of these structures are sacrificed before the correct diagnosis is mad Other sites are the malar eminence and inner angle of the orbit.

In frontal sinus·infection, the pain is above the eye and spreads over the for head. Frequently it is not present first thing in the morning, but comes (an hour or two after waking and abates in the late afternoon. This periodici is most characteristic.

Ethmoidal pain is situated deeply behind the eye, and is described as burstin whilst in an acute sphenoid, the pain may be in the middle of the forehead (occiput, or may be referred to the mastoid process.

There is *tenderness* on pressure over the cheek, when the antra are involve and over the forehead and particularly under the supra-orbital ridge, that is to s on the floor, when the frontal sinus is at fault.

Examination of the inside of the nose shows the mucous membrane marked swollen, sometimes injected, but often pale in colour.

Discharge may be visible and if it can be seen to be coming from under t middle turbinate, one or more of the anterior group of sinuses must constitute t source. Discharge lying between the middle turbinate and septum comes fro the posterior ethmoids or sphenoids. Sometimes discharge can be seen only on po nasal examination, when, if it is flowing over the posterior end of the infen turbinate, the anterior group is involved. Pus higher up comes from the posten group. If obstruction is marked and drainage poor, little or no discharge m get into the nose and its absence does not negative the diagnosis.

Swelling of the cheek is rarely the result of an infected antrum and is genera of dental origin, but œdema at the inner angle of the orbit or of the upper eyel from ethmoids and frontal sinus respectively, is not uncommon and may occ early in the course of the illness, although it is usually a late sign.

Transillumination is of great value, and in the absence of a special lamp, a

rch, or preferably a pencil light, can be used. The light when placed in the outh, after the removal of an upper denture, will shine through the palate into e antrum and through the roof, so that it appears as a crescent of light just above e infra-orbital margin, and may illuminate the pupil. Light showing through e cheek or nose is ignored.

If the antrum is filled with pus, little light gets through and the crescent is dim · altogether absent. Since the antra are nearly always symmetrical, a marked fference is of significance. If neither side will light up, the information gained not of so much value, as it may be that both sides are infected or merely that the one is unusually thick.

When examining a frontal sinus, the light is placed under· the supra-orbital largin against the floor, and if necessary must be shielded from the eyes of the bserver. Failure to light up a frontal sinus does not prove that it is at fault, since le sinus may be small or absent altogether, but one that lights up well may be osolved from blame.

If there is doubt, and always in the case of ethmoids and sphenoids, where trans-lumination is impossible, an X-ray examination must be made.

DIFFERENTIAL DIAGNOSIS

ental abscess.—The most prominent feature is a painful tender swelling of the heek, best felt through the upper buccal sulcus. As has already been stated, welling of the face is uncommon in antral disease. The absence of nasal signs, ccept for slight dullness on transillumination (which is due to œdema of the soft ssues of the cheek) and perhaps the presence of an obviously carious tooth, should ad to the correct diagnosis.

Angioneurotic œdema.—This is a rare condition causing a sudden recurring ainless swelling which may involve the cheek. Again nasal symptoms, except of vasomotor type, are absent.

Orbital periostitis and orbital abscess cause swelling around and in the orbit. hey can be late stages of an ethmoiditis which has perforated into the orbit, but se not always so. Orbital periostitis simulates ethmoiditis and the differential lagnosis rests chiefly on the inability to demonstrate ethmoidal disease.

An abscess inside the orbital periosteum is easily distinguished by the limitation of ocular movements, and is not commonly due to ethmoiditis, since the peri-steum presents an effective barrier to the spread of infection.

Facial neuralgia causes pain in the region of the frontal sinus or antrum, but it characteristically spasmodic, shooting, brought on by washing, eating or cold inds, and is quite different from the fairly steady aching pain of an infected sinus. ransillumination is normal, and again clinical signs of infection are absent.

TREATMENT

n acute infection of any of the nasal sinuses, and particularly of the frontal sinus ethmoids, must be regarded as at least potentially dangerous, and the patient

should be confined to his home, preferably in bed, and kept on a light diet w
plenty of fluids and the necessary attention to the bowels.

Penicillin.—Owing to its scarcity, penicillin has been used only in cases
complications, but it would certainly be just as effective in straightforward
and it is probable that, provided the organism is not resistant, the use of th
substance will revolutionize treatment.

The sulphonamides.—The value of routine chemotherapy in the early stages u
the disease is certainly open to question. The sulphonamide drugs act directl
upon the infecting organisms but cannot be guaranteed to do more than reduc
their number. If this number is reduced too soon the patient will not develo;
his own immunity, upon which the final eradication of the infection depends.
The other possibility is that a partial cure, by diminishing the severity of ,
and symptoms, may delay recognition of the onset of some complication. In ...
media this danger is a real one and, although possibly less when the sinuses a
involved, it cannot be ignored. It is probably correct to say that chemotherap;
should not be begun during the first four days, although I would like to go furthe
and suggest that these drugs should not be employed so long as the patient i
progressing favourably. It must, however, be emphasized that whether the
sulphonamide compounds are used or not, local treatment remains of paramoun;
importance.

Drainage of these large pus-filled cavities is essential and the aim is to shrin
the swollen mucosa lining their ostia and also the middle turbinate, which add
to the obstruction.

Drugs can be introduced to the nose either as inhalations of steam or as drops
For the first, the time-honoured remedy of Friar's balsam, with or without th
addition of menthol, is strongly recommended. An ordinary jug makes the bes
receptacle, and head and jug must be closely enveloped in a towel, so that as mud
hot steam as possible reaches the nose.

The choice of drops is subject to personal preference: adrenaline, ephedring
or a mixture such as adrephine, added to argyrol 5 per cent., colloidal silv
or normal saline are all excellent. The following is a useful prescription:—

R Adrephine................................ 60 minims
Collosol argentum .... to 1 ounce

If employing silver preparations, it is advisable to warn the patient against ...
his handkerchief, as the stains are difficult to remove.

A prepartion called "sulfex" has recently been placed on the market. It cons...
of sulphathiazole and a new vasoconstrictor. The value of the sulphathiazole i
difficult to assess, but the vasoconstrictor has a strong and prolonged action an
is most effective.

A glance at fig. B makes it obvious that drops put into the nose with the hea
tilted back, will run along the floor and into the pharynx and can never reach
all-important middle turbinate region. It is therefore essential that the patien;
should be instructed to lie diagonally across the bed with his head tipped backward
over the side, so that his nose is upside down. Thirty to sixty minims of the drop;
slightly warmed, are inserted and the position maintained for three minutes.

a really acute case the two forms of treatment should be used alternately
'o-hourly intervals during the day. It is not necessary to wake the patient
ght.

in, if severe, must be controlled in order to gain the two or three days necessary
he treatment to take effect. As a rule improvement soon takes place. The
erature drops, pain eases and the nose becomes less blocked. The number
eatments may now be gradually reduced, first to three or four each day and
ly to night and morning. In ten days to a fortnight the patient will probably
ider himself well, but the practitioner must not be satisfied until trans-
nination returns to the normal, an event to be expected within three weeks.

metimes, however, the acute symptoms do not subside, or the sinus remains
. When several sinuses are involved it is the antrum which is the key to the
ition. The volume of infection from this, the largest of the nasal sinuses,
:ributes much to the œdema of middle meatus and an improvement in its
lition leads to improved drainage from the frontal sinus and ethmoids.
refore the next step is to puncture and wash out the antrum, and at this stage
notherapy may be started, an adequate dose being given and the course being
le to last four days.

ntrum puncture, although not difficult, needs practice and is usually left to the
:ialist. Wash-outs are repeated at intervals until two completely negative results
e been obtained. More drastic operative procedure is rarely necessary.

Vhen an antral infection follows dental extraction, the position is complicated
the presence of a fistula. It is essential that this fistula shall close, and this is
vented by a constant flow of discharge into the mouth. Antrum puncture should
refore be started during the first few days. It is easy to wash out the antrum
the fistula, but this is a certain method of preventing its closure and must
er be employed.

Vhen a frontal sinus fails to respond to conservative treatment, operation
nnot be avoided, since no measure comparable to antrum puncture is possible.
there is marked external swelling, with the probability of perforation of the
us wall, it is advisable to undertake an external approach with simple drainage.
thing should be done inside the nose, since the infundibulum will open up as
n as the infection subsides.

n less advanced cases the removal of the anterior end of the middle turbinate,
h possibly the gentle passage of a bougie into the sinus, will provide adequate
inage. More extensive intranasal procedures are definitely contraindicated.

The ethmoids can be reached either intranasally or externally, and, as with the
ntal sinus, the latter approach is advisable if there is much external swelling.

The sphenoidal sinus can be drained by removing some of its anterior wall
as to enlarge the natural opening.

No operative measure, antrum puncture included, should be employed during
e first days, unless unsatisfactory progress or the onset of complications makes it
ite obvious that this cannot be avoided. Even the most simple operation inflicts
uma upon both mucous membrane and bone and may encourage the spread of
fection. Osteomyelitis of the facial bones, although fortunately an uncommon
mplication, is the one most to be dreaded and in the past was practically always

fatal. This risk becomes slight if the patient has had time to develop his own immunity.

Repeated acute attacks, usually involving the same sinus or sinuses, call for investigation during a quiescent period. It will generally be found that there is a deflection of the nasal septum, although possibly only of the upper part. As a rule the trouble occurs on the side of the convexity, but not always. There is a physiological hypertrophy of the middle turbinate on the concave side, and the turbinate, by virtue of its size, may be capable in response to infection of such enlargement as to cause obstruction. A sub-mucous resection of septum with reduction of a large turbinate usually puts an end to these attacks.

COMPLICATIONS

Complications are not common, but unfortunately when they do occur are usually dangerous. They are much more often found during an acute exacerbation of chronic disease than in an infection of a previously normal sinus, but the symptoms are the same and the practitioner must be on the look out for such a situation. A history of previous attacks does not necessarily mean chronic disease, but persistent discharge, particularly if yellow in colour, implies that resolution was never complete. The presence of nasal polypi usually means that there has been gross disease for a long time.

It must be emphasized that any worsening of the position in such a case calls active measures without delay.

Space does not allow more than an enumeration of the main complications:—

Osteomyelitis.—This serious disease may follow infection of the antrum or frontal sinus. In the past the only hope of cure lay in very extensive and mutil : operations for the removal of the superior maxilla and frontal bone. Successful results have been obtained in cases in which the disease was confined to the frontal bone; but if the maxilla is involved there is usually a fatal termination. The prognosis has greatly improved with the introduction of penicillin.

Cavernous sinus thrombosis.—This may follow acute ethmoiditis, the infection reaching the cavernous sinus by way of the ophthalmic veins. Again penicillin is almost the only hope.

Meningitis and frontal lobe abscess.—These result from perforation of the posterior wall of the frontal sinus, and occur as a rule during an acute exacerbation of chronic disease. The first is usually amenable to sulphonamides or penicillin, and drainage of a cerebral abscess offers reasonable hope of success.

If this list of possible calamities convinces the medical practitioner of the need for early and energetic local treatment in all cases of acute sinusitis, it will have served its purpose, and with reasonable good fortune they will never come his way.

IE CHRONIC RUNNING NOSE IN CHILDREN

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ANATOMY

IE more important points of the anatomy of the structures within the nose,
rant to the subject of this article, may briefly have first consideration.

he *turbinates*, superior, middle and inferior, divide the nasal fossa into three
ti; the superior, middle and inferior. Rarely a fourth turbinate is observed.

n the submucous tissue of the membrane covering these bones are venous
nuses—the erectile tissue of the nose. This tissue is present chiefly on the
terior ends of the inferior and middle turbinals and along the lower border of the
rior turbinal. Vasomotor nerves regulate the function of the erectile tissue,
ch is to warm inspired air, and control serous secretion. When the function is
urbed, inspired air is not properly prepared for entry into the lungs, and may
se irritation of the mucous lining, disturb the transfusion of oxygen and carbon
xide, and interfere with the processes of tissue metabolism.

The superior meatus is the slit-like space above the middle turbinal bone, and
o it drain the posterior group of ethmoid cells, whilst into its highest and most
terior part drains the sphenoid sinus.

The middle meatus occupies the space between the middle and inferior turbinal
nes. On its outer wall, and covered by the anterior portion of the middle turbinal,
he infundibulum. Into this, through their orifices, drain the maxillary antrum,
ntal sinus and anterior ethmoid cells.

The inferior meatus is the area between the inferior turbinal and the floor of
e nose, and, little more than an inch from the margin of the nostril on the lateral
ll, drains the naso-lachrymal duct.

The ethmoid cells are situated between the orbit and the outer wall of the nasal
ssa. They vary in number and size. They are present at birth and reach their
ll development at puberty.

The sphenoidal sinus is situate within the body of the sphenoid bone, and its roof
in close relation to the cranial cavity. It is not present at birth and only attains
e size of a pea during the first few years of life.

The frontal sinus appears about the third year of life and reaches full development
ter puberty. The two frontal sinuses often differ greatly in size and shape;
ccasionally one may be absent entirely. The fronto-nasal duct connects the sinus
ith the upper part of the infundibulum, into which it drains.

The maxillary antrum is the largest of the nasal accessory sinuses and occupies
space roughly pyramidal in shape, with base towards the nasal fossa and apex
the zygomatic process of the maxilla.

The nasal mucous membrane is of the columnar type and rich in blood vessels,
rves and glands. It is continuous with that of the accessory sinuses and the
sopharynx. There is lymphatic continuity between all the sinuses of the nose.

From this it will be understood that the sinuses share the troubles of the mucous lining of the nose proper. There are two regions of the nasal mucosa, the olfactory and the respiratory. The olfactory is concerned with the sense of smell and is non-ciliated, whilst the respiratory is ciliated, as is also the mucous lining of the sinuses and the nasopharynx.

PHYSIOLOGY

The functions of the nose are olfactory, phonatory, respiratory, gustatory, and the ventilation of the sinuses. It has been shown experimentally that whatever the temperature of the air before its passage through the nose, it has been raised to blood-heat by the time it reaches the pharynx, and has also become saturated with moisture. Consequently for the maintenance of a healthy condition of the lower respiratory tract, free nasal respiration is important. Further, although inspired air contains many organisms, expired air is practically germ-free. Some of the organisms are arrested in the vestibule, whilst others are arrested in the nasal cavity and are removed by the cilia and the downflow of mucus.

The area of mucous membrane lining the nasal passages has been estimated at 40 square inches or more in the fully developed organ.

In 1924, Yates introduced Indian ink into the antrum and within a few minutes the cilia had swept it out into the middle meatus, thence into the post-nasal space, where the stream of ink divided and sent out an anterior streak which reached the tonsil. Proetz (1931) has demonstrated slow-motion pictures of cilia, and estimates that their action consists of about 250 bends per minute. He has shown also that mucus is swept backwards constantly from the nasal cavities and sinuses. Yates (1927) also introduced some indigo-carmine solution into an antrum in which there was inhibition of ciliary activity, and found the dye in the urine within a few minutes, thus showing that it had been absorbed through the mucous membrane because the cilia had been unable to remove it, as they would have done if healthy.

In 1929, Le Gros Clark introduced dye into the noses of animals and found that it had been absorbed into the lymphatic glands around the larynx, into the lymphatics of the orbital cavity, into the cranial cavity, and into the inter-muscular planes of the posterior parts of the neck. From these experiments it is clear that there must be an intimate relationship between infection of the nasal passages and disorders in distant parts of the body. In fact, there is a more or less intimate connexion between all the organs of the body by the lymphatic, vascular and nervous systems, so that disturbances in one may affect the others.

Any condition which interferes with the normal function of breathing will affect the interchange of gases which takes place in the air vesicles of the lungs. A deficiency of oxygen and an excessive accumulation of carbon dioxide in the blood give rise to disturbed conditions of the digestive, assimilative and nutritive functions and to infective processes. Toxins which are thrown into the circulation, produce headache, peevishness, mental depression, aprosexia and general malaise.

Putrefactive and pathogenic bacteria swallowed with the secretions from the nose and throat still further disturb the digestive functions. Such discharges are present in chronic follicular tonsillitis, nasal stenosis, post-pharyngeal catarrh, sinusitis, chronic rhinitis and atrophic rhinitis. These discharges also cause

rritation and inflammation of the post-nasal space, which often extends to the middle ear, and also irritation of the lower respiratory tract, which gives rise to catarrhal inflammation.

All nasal discharge results from inflammation. Acute inflammation is excited by irritant material in the tissues. This irritant is usually a pathogenic micro-organism and its toxin, although it may be of chemical or traumatic origin. The reaction of the tissues is increased hyperæmia, increased nutrition which is promoted by the hyperæmia, thus tending to increase resistance, and increased leuco-cytosis. This reaction is usually insufficient to deal with the organisms and their toxins before they have caused damage to the tissues. Consequently, treatment should be aimed at promoting the reaction of inflammation, so that the organisms, their toxins, and the broken-down tissue cells may be removed as speedily as possible. In chronic inflammation the reaction consists of the same phenomena as in the acute form, but in much less degree.

ETIOLOGY

The etiological factors of inflammatory diseases of the nose and accessory sinuses are (a) exciting causes and (b) predisposing causes.

As already stated, bacteria and chemical and traumatic destruction of tissue cells are the *exciting causes*. Except possibly when they are exceedingly virulent, pathogenic organisms cause no harm to the tissues, so long as they are healthy, which means that the resistance of the cells is normal. Such organisms are always present in the upper respiratory tract, but until the resistance of the cells is reduced by some external or internal influence, they have no ill-effect on the tissues.

PREDISPOSING CAUSES may be classified as extranasal and intranasal. Among the *extranasal causes* may be mentioned:—

(1) Age: The incidence of inflammatory diseases of the nose and accessory sinuses is much higher in young children and young adults than in those of more mature years.

(2) Sex: Males are more affected than females.

(3) Climate: Exposure to cold wet weather, with sudden and frequent changes of temperature, causes a certain amount of shock to the vasomotor nervous system, which in turn tends to reduce the resistance of the mucous membrane of the nose and sinuses, thus favouring bacterial growth.

(4) Exposure, especially of the feet to wet and cold, is a common cause of rhinitis and sinusitis and also of inflammations in other regions of the body.

(5) Clothing: This should be neither too heavy nor too light. The former makes the skin too sensitive to any exposure and the latter throws undue strain on the vitality. Wool should never be worn next to the skin. It does not absorb easily, and when at last it has absorbed the fluid given off by the skin it does not part with it easily, and consequently efficient respiration of the skin is hampered. It can, however, be worn with advantage as a covering garment. The most scientific and best type of underwear is a mesh with tiny spaces which allow respiration free play and contain warm air. A very good mesh is a combination of linen and cotton. With this the moisture is absorbed rapidly, and passed off rapidly.

(6) Digestive disorders cause lowered resistance, through the entry of noxious material into the vascular lymphatic circulation.

(7) Constitutional diseases: Syphilis, diabetes, and all diseases due to faulty metabolism, affect the tissues of the respiratory tract by causing a lowered resistance. .

Intranasal predisposing causes.—The general law that cavities lined with mucous membrane are predisposed to inflammation when their drainage and ventilation are disturbed goes far to explain the occurrence of infection and inflammation of the nose and accessory sinuses.

Obstruction in the lower part of the nose, e.g., by septal spurs or ridges, does not, as a rule, interfere with ventilation and drainage, and therefore does not markedly lower the resistance of the mucous membrane, especially of the sinuses and upper part of nose. Lesions in this area, however, may cause a turgescence of the mucous membrane which after a time may result in hypertrophy—hypertrophic rhinitis. When, however, obstruction, due either to septal or turbinal deformity, enlarged projecting bulla ethmoidalis, or cells in the uncinate process, is present in the upper portion of the nose, ventilation and drainage of the nose and sinuses are impaired. The secretions are retained and undergo decomposition, thus irritating the mucous membrane and lowering its resistance and functional activity. Infection occurs, and between the various acute attacks a low-grade infective inflammation persists. This causes a proliferation of cells, usually connective-tissue cells, and gives rise to what is known as hyperplastic rhinitis.

The inflammation may be catarrhal or suppurative, acute or chronic, and may extend by continuity of tissue from one area of nasal mucous membrane to another to the sinuses and any or all parts of the middle ear.

THERAPEUTIC MEASURES

After considering on general lines the causes of inflammation and its sequelæ it is well now to review some of the therapeutic measures employed to promote the reaction of inflammation.

It has been shown that inflammation is a series of reactions excited by the presence of bacteria, their toxins and the cellular debris. The object of the reactions is to rid the tissues of these substances. Experience has shown that in acute inflammation the reaction is not sufficient to do this as quickly as should be to prevent damage to the tissues.

It is therefore rational therapy to promote the inflammatory reaction rather than to repress it. So that any measures directed to this end should find a place in treatment.

Irrigation.—This mechanically removes secretions and thereby lessens the local irritant, and also promotes the inflammatory reaction slightly by increasing local hyperæmia. In acute inflammation, e.g., acute sinusitis, this procedure may add sufficiently to the effort of the tissues to bring about a speedy healing. In chronic cases there is much tissue proliferation, and whilst irrigation may be employed usefully, it cannot be expected to remove the tissue proliferation.

Radiant heat.—This treatment promotes inflammatory reactions and thus assists

the removal of organisms and other noxious material. It operates most successfully in many acute cases; in chronic cases it is not so effective.

Suction.—Various forms of apparatus have been devised for this purpose. The inciple in all is to produce a negative air-pressure in the nose and air-cavities of : head. This causes increased hyperæmia and thus assists the reaction of inflammation. It may be combined with the introduction of solutions into the sinuses, ch as neo-synephrin or ephedrine, as in the Proetz displacement method.

It is carried out by first introducing the solution into the nose, the patient's head being in correct position (head well back so that the chin is vertically over the ear). Negative -pressure is then produced by the withdrawal of air from the nose and sinuses. The lution then flows into the cavities, taking the place of the withdrawn air.

This form of treatment is most effective in many sinus conditions, rhinitis, bal catarrh and inflammation of the tonsil.

Ultra-violet rays, as produced by the water-cooled quartz lamp, assist the reaction. inflammation and are bactericidal to organisms.

Diathermy is useful in many cases, by promoting the reaction of inflammation.

Solutions of drops and sprays.—Many medicaments have been employed in the rm of spray or drops. Generally speaking their scope of usefulness is limited.

Zinc ionization.—The zinc ion is particularly effective in sterilizing infected eas to which it is applied, and thus eliminating the bacteria and their toxins. t the same time the reaction of inflammation is promoted. The zinc ion, being arged electro-positively, is introduced under the positive pole. This method of eatment is effective in many cases of infected sinuses, ozæna, nasal obstruction, asal catarrh, and hay fever.

Diastolization.—This method of treatment of nasal obstruction and nasal isufficiency was presented at the Academy of Medicine, in Paris in 1923, by the te Dr. Georges Gautier. The apparatus consists of various sizes of hollow rubber ougies capable of small dilatation, and shaped to adapt them to the nasal canal. hey are triangularly oval in section and taper towards the distal blind end, which introduced into the nose. At the proximal open end a pneumatic bulb is attached y means of a glass adapter. By compression of the bulb the bougie dilates under e pressure of the air within, and when the pressure is relaxed, air returns to ie bulb.

Technique: Nose and mouth are washed out. The bougies are sterilized by boiling, nd the smallest size is dipped into normal saline solution. This is introduced into one side the nose, keeping to the floor, so that the blind end passes as far as the nasopharynx. is well to allow it to remain in this position (preferably dilated) for about five minutes. hen slow in-and-out movements of the bougie are initiated, compressing the bulb slightly n entry and relaxing it on withdrawal. This movement is repeated about forty times. hen the next size larger is introduced into the same nasal fossa, and the process repeated. he same procedure is carried out on the other side of the nose. The patient should breathe sally, if possible, during treatment, as this effects a suction action on the sinuses. Bougies progressively larger sizes are used in subsequent treatments.

The mode of action of the treatment is complex, but by the contact with the ssues and the massage movement, the bougie acts as a stimulus, and by reflexo- lerapeutic action, capillary stasis is diminished and there is glandular disgorge- lent, causing retraction of the turgescent and congested mucosa and thus assisting

it to employ its natural defences against infection. By its reflex action through central nervous and sympathetic systems beneficial effects are produced in organs far removed from the area of application.

ORIGIN OF NASAL DISCHARGE

Nearly all cases of nasal discharge in children are due to (1) repeated and neglected colds; (2) acute inflammation of the upper respiratory tract, such as those occurring in measles, influenza, whooping-cough, pneumonia, scarlet fever, and diphtheria; (3) foreign body in the nose; and (4) adenoids.

All these are acute in the first instance, but many develop into the chronic stage.

The conditions found locally are nasal catarrh, nasal obstruction, hypertrophic rhinitis, hyperplastic rhinitis, sinusitis, septic tonsils and adenoids. In addition there are many systemic effects due to the local condition.

The presence of a *foreign body* should be suspected if the discharge is unilateral. Sinuses should be investigated in cases of (1) repeated colds in otherwise healthy children; (2) continuous nasal discharge; (3) severe cough with no chest findings; (4) recurring attacks of otitis media; (5) habitual growing pains; (6) unexplained daily rise in temperature; (7) chronic nephritis; (8) habitual anorexia; (9) persistent nasal obstruction; (10) inflammation of tonsils and adenoids; (11) chronic recurrent pulmonary disease of any type; (12) recurrent attacks pink-eye, iritis or squint; (13) facial dermatitis; (14) recurrent herpes of the face. Sometimes intranasal inspection reveals pus or muco-pus limited to the areas of drainage of the various sinuses; more frequently, however, this is not the case. The most complete method of investigating the sinuses is by the introduction into them of lipiodol followed by X-ray examination. This enables a fairly accurate diagnosis to be made of the actual condition. Most cases of sinus trouble in children can be relieved successfully by the Proetz displacement method. Zinc ionization is also most effective, but the technique is complicated and can only be entrusted to experienced hands.

Tonsils and adenoids should only be removed by operation if septic. Before deciding on removal, sinus disease must be excluded. If present, the sinus condition must be dealt with first, as it may be responsible for the unhealthy state of the tonsils and adenoids. If necessary these may be removed later. Treatment of the tonsils by the method of tonsil suction gives promising results and should be more extensively used than it is.

Diastolization may be employed with advantage in all these conditions, although it will not clear up a diseased sinus or straighten a deflected septum. In my experience 2,191 children out of several score of thousands tested by the gramophone audiometer were found to have defective hearing sufficiently severe to fail in their test on three consecutive occasions. The hearing defect of all these children was diagnosed as due to pathological nasal conditions, and all were given a course of diastolization of varying duration, according to the needs of each case. After treatment, not only had the nasal condition improved in a large percentage of the children but 1,257, or 57 per cent., had improved sufficiently to enable them to

s the test, and a further 535, or 24 per cent., had improved, though not quite
ugh to pass, whilst 399, or 18 per cent., registered no improvement in hearing.

GENERAL TREATMENT

addition to local treatment, environmental conditions are important. Hygienic
tilation, and elimination of overcrowded, poor and damp housing and
ygienic school buildings, will help to raise a child's resistance.
Iqually, or even more, important are dietetic considerations. These children
uld have plenty of milk, eggs and fats, and all "catarrhal" cases should reduce
intake of starches and sugars and partake liberally of raw garden produce,
ecially the green variety, in the form of salads daily. The administration of
3e doses of vitamins A and D, and sometimes of iron, is also beneficial.

PREVENTION

is should be the unqualified aim in these as in all other defects of health.
In addition to the dietetic, environmental and personal hygiene, including
thing considerations already referred to, every child leaving a fever hospital or
ving been a victim of other infective disease, should be followed up by the
inological service and kept under observation and treatment, when necessary,
til the upper respiratory tract is in a satisfactory condition.
For many years I have recommended that the first two or three minutes of both
orning and afternoon sessions in all schools throughout the country should be
ent in nasal drill. This consists first in clearing the nose. The correct way to do
is is to hold the handkerchief (preferably of paper which can be burned after use)
) to the nose without pinching it, thus leaving both sides free, and blow. Then
ternately press on one side and blow, without violence, through the open side.
)llowing this, which should take no longer than half a minute, the remainder of
e time should be spent in deep breathing exercises in and out through the nose.
ot only does this practice operate to the benefit of the child, but a vigilant teacher,
atching the class daily, should detect any child who is unable to blow properly,
eathe nasally without difficulty, or whose nose is habitually "dirty." Note should
: made of these and the school medical officer informed, so that the child may
: handed over to the rhinological service immediately.
If such measures as these were undertaken seriously, regularly and universally,
ere would follow a considerable decrease in the incidence of chronic nasal and
ural disease, both in childhood and adult life.

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ALLERGIC AFFECTIONS OF THE NOSE

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ALLERGY is an abnormal sensitivity of the body cells to a foreign substance. There are three factors in the production of an allergic condition:—

In the first place the body cells in these cases usually show an inherited predisposition to the allergic diathesis. The exact nature of this predisposition is not known but it is probably in the autonomic nervous system that the instability lies.

Secondly, there is a specific factor in which the specific sensitizing allergens are either inhaled or ingested. In any case of a suspected allergic disease, these or similar proteins may be or may contain the substance which is the cause of the condition; any or all will be harmless to a non-allergic subject, but to a patient with the predisposition they are the true exciting cause.

The third factor is non-specific and non-allergic, and is often nasal in origin. Toxic, metabolic, environmental or psychic factors are common, but it is particularly with the nasal factor and the nasal condition that this article is concerned. Although the rhinologist, dietitian, or the psychologist may be able to reproduce the normal balanced state by removing the non-specific factor in his own speciality, it is the allergic specific factor that is most important.

PATHOGENESIS AND CHARACTERISTICS OF ALLERGY

An upset in the allergic balance of the body will manifest itself in many ways, even more than are as yet suspected. The following conditions are frequently, and in some cases always, manifestations of allergy:—

> Asthma
> Hay fever
> Spasmodic rhinorrhœa (or allergic rhinitis)
> Polyposis
> Eczema
> Urticaria
> Purpura
> Epilepsy
> Migraine

There are certain common features which are characteristic of all allergic diseases:—

(1) *Family history.*—In allergic cases there is nearly always a history of similar or other allergic manifestations in other members of the family. The infant with eczema will often be found with a parent suffering from spasmodic rhinorrhœa or asthma and, although there may be more distant relatives who are co-sufferers, a close relationship is frequently found.

(2) *Past history of previous allergic states.*—The patient with a nasal allergy is frequently found to have had "croup" or laryngeal sub-glottic œdema, due to a

sitivity to feathers in the pillow as a child, and may have suffered from a smodic rhinorrhœa due to dust or face-powder before becoming an asthmatic. e allergic manifestation changes and so, unfortunately, does the allergen. asmodic rhinorrhœa may be caused mainly by orris root at one time and feathers dust at another.

3) *Present history of allergic symptoms.*—These symptoms often have a character-c periodicity: asthmatic attacks may be chiefly nocturnal or emotional; smodic rhinorrhœa in the morning on rising; laryngeal "croup" is nearly always cturnal, and urticaria often comes at a definite time of day.

(4) *Pathological examinations.*—Skin reactions may reveal the allergen to which e patient is particularly sensitive; a definite and individual positive reaction is the utmost use, whilst an indefinite reaction to a number of common proteins not usually helpful.

As an aid to the diagnosis a blood picture will often reveal an eosinophilia and mear of the nasal secretion will also show a number of eosinophils in the specimen. milarly, sections of the mucous membrane will show an abnormal number of sinophils in the tissues.

These general considerations are applicable to all allergic manifestations in e nose.

SPASMODIC RHINORRHŒA AND HAY FEVER

he most common allergic condition is probably spasmodic rhinorrhœa. It is also nown as vasomotor rhinitis or allergic rhinitis, and tne difficulty of fixing a name due to the little that is known about its pathology. But, whatever name may be iven to it, the illness must be recognized, for illness it is. When the allergic iinitis is seasonal and due to pollens, it is called hay fever and is more easily ecognizable. The patient often makes his own diagnosis. But when the attacks f sneezing and discharge occur at any time of the year, and especially when they ccur at the same time as an epidemic of the common cold, they may easily be iistaken for one another.

In any hospital out-patient department a great many patients are seen who are ent up with recurrent "colds," with suggestions for treatment by vaccines or urgery, when the whole condition is allergic in origin.

In children, too, the allergic factor is frequently missed. An allergic child is too ften subjected to removal of tonsils and adenoids, and not unusually to second ttempts at curetting adenoids, when the stuffiness, catarrh, sneezing and mouth reathing are actually due to the sensitivity of the mucous membrane to some foreign protein. How often it is said or reported that at the second adenoid curet-age very little regrowth of adenoid tissue was found, and *still* the allergic factor is missed.

In these cases the family history often strengthens a suspicion if other members are afflicted with allergic symptoms, and the past history may strongly suggest an allergic rhinitis, if there have been other or similar previous manifestations. The present history is of attacks of sneezing with a watery discharge which is thin and soaks rather than dirties the handkerchief. Often three or six large handkerchiefs may be soaked each morning in non-seasonal spasmodic rhinorrhœa, and in hay fever similar symptoms will result when a sensitive patient is exposed to

pollens. These attacks are followed by nasal obstruction due to swelling of the nasal mucous membrane.

During the attacks of sneezing, or often during the period of acute obstruction the mucous membrane will be seen to be swollen and bluish-red—not the bright red appearance of the mucous membrane in acute infections. After several attacks, or between attacks, the obstruction does not completely subside, and the pale, bluish-white mucous membrane is typical of all allergic conditions in the nose.

As soon as this nasal allergy is well recognized, and especially when a few · · „ are cured of their chronic "colds" by anti-allergic measures instead of by the more usual anti-cold treatments, the tendency is then to overlook secondary infections which so frequently occur. Any obstructed tube or cavity in the body tends to become infected, and the nose and sinuses are no exception. Allergy provides the obstruction, but the infection must be recognized and dealt with first, or the treatment of the allergic condition will not be successful.

To summarize, the patient with sneezing and rhinorrhœa who has a pale swelling of the nasal mucous membrane, an eosinophilia or eosinophils in the fluid from the nose, but no pus or muco-pus in the nose, is suffering from·allergic rhinitis.

TREATMENT.—In the first place, these patients must be submitted to a rhino-logical examination to exclude infection as, even in true allergic states, secondary infection is common, and anti-allergic treatment is doomed to failure unless the sepsis is dealt with at the same time. The converse is also true, i.e., it is no use treating infection in the allergic without at the same time desensitizing the patient. The infection will almost always recur if this is not done. A focus of i f..: excluded, a complete bacteriological examination of the upper respiratory tract and the skin reactions to groups of proteins should be carried out.

The *skin tests* are particularly useful in hay fever to identify the particular pollen of grasses, flowers and trees to which the patient is sensitive. They are often helpful, too, in identifying the protein in cases of spasmodic rhinorrhœa. A brisk reaction to feathers, for example, may suggest either a change of work, or the use of kapok pillows instead of feathers and down, and so on.

In America, more reliance is placed upon these tests than in this country and the condition is treated more specifically and less with the blunderbuss "mixed inhalant" vaccines.

· *Vaccines.*—Bacteriological examination frequently reveals a persistent pathogen in the nose or post-nasal space, and in children, particularly, this may be of value, especially in those cases in which the attacks of sneezing and rhinorrhœa are precipitated by a cold in the nose. A vaccine prepared from such an organism incorporated with a protein solution, if a specific reaction to the particular protein is found, is often most satisfactory.

The *non-specific treatments* are many and their number indicates the uncertain results from their use. The simplest treatment for an uncomplicated case of spasmodic rhinorrhœa, either seasonal or not, is to give large doses of calcium by injection and by mouth. The latter dose should be 150 grains of calcium gluconate, three times a day. Ephedrine, ½ a grain three or four times a day, may help to cut short the sneezing and therefore the subsequent obstruction. Sprays containing cocaine probably give the most relief but should be masked and prescribed with

consideration to the habit-forming feature of the drug. In general, other local
lications to the nose are irritating. Sanfoin—a proprietary preparation—is
oful in some cases. A weak solution of adrenaline, or the proprietary "estiven,"
l allay the conjunctival irritation which often accompanies these allergic
iditions.

SURGICAL PROCEDURES.—Of the minor surgical procedures to reduce the
sitivity locally, cauterization of sensitive spots, applications of chemical caustics,
l zinc ionization, all have their advocates and each is sometimes useful.

n *cauterization of sensitive spots*, it is important to identify the spots, and this
est done while the mucous membrane is being anæsthetized with cocaine. The
ts are the last to be anæsthetized.

Painting of turbinates or the tubercle of the septum with trichloracetic acid
en helps but destroys some of the valuable ciliæ. This is also a drawback to
c ionization, although, here again, good results are often obtained. Obviously
se methods are more helpful in the seasonal than in the non-seasonal spasmodic
norrhœa. They get the patient through the short hay fever season but are not
helpful when applied to a condition that continues throughout the year.

ALLERGY AND THE SINUSES

nasal allergy, the swelling of the mucous membrane both in the acute attacks
d in the chronic state can easily be seen. This swelling of the mucous membrane
o affects the lining of the sinuses.

In a case of *allergic asthma* the nasal mucous membrane frequently shows the
relling and the pallor which is so characteristic of chronic allergic states and,
though there is no demonstrable infection, transillumination may show dull antra
d frontal sinuses, and skiagrams may confirm this. The X-rays will show a
niform opacity, often not very marked, affecting one or more or all sinuses. There
usually no evidence of a fluid level. If an antral puncture is performed and the
ashings collected, they will frequently be found to be sterile, and an excess of
sinophils may be found in the centrifugalized deposit.

The symptoms associated with this condition will be negligible or absent,
though there will usually be some nasal obstruction and perhaps the feeling of
thick head. Such symptoms may be transitory only, as the thickening of the lining
embrane varies from hour to hour in the same way as the stuffy nose.

The treatment is the treatment of the allergic state as discussed for spasmodic
inorrhœa. Local treatment is not usually indicated. If, however, the symptoms
rsist, *ephedrine displacements* may help in these cases.

This is a method of persuading a solution of ephedrine to enter the sinuses. It is essential
shrink up the mucous membrane of the nose first, and this is accomplished with a cocaine
ray. With the patient lying down and the head laid right back with the chin in the air,
e nose is filled with ephedrine solution Suction is applied to the nasal vestibule, so sucking
r up through the ephedrine solution from the sinuses When the pressure is released, the
lution runs into the sinuses to the extent of the air displaced. By repeating this perform-
ice, an appreciable amount of the solution gets into the sinuses and produces shrinkage
the mucous membrane. It is obvious that this is only palliative, and the treatment should
directed in the main to reducing the allergic sensitivity of the mucous membrane.

An interesting extension of this manœuvre is to substitute lipiodol for the
hedrine. An X-ray will show the lipiodol in the centre of a sinus containing a

thick lining membrane. If the patient is given an injection of adrenaline, a furt
X-ray taken shortly after may show the shrinkage that takes place in the muc(
membrane.

An allergic swelling of the mucous membrane may give rise to more seri
symptoms if the natural ostium is closed by swelling. Air in the sinus may
absorbed, so producing a reduction in the pressure in the sinuses. This gives 1
to vacuum pain in much the same way that pressure in a sinus due to a collect
of pus gives rise to pain. The frontal is, of course, the sinus most commo
affected, in view of the long narrow duct from the sinus to the middle meatus
the nose. This condition of *vacuum frontal headache* is frequently confused w
a frontal sinusitis. It is diagnosed by the absence of evidence of infection in
nose; by the X-ray appearances, and sometimes by the dramatic response to lo
application of adrenaline high up in the middle meatus, perhaps associated w
levering out the anterior end of the middle turbinate.

POLYPOSIS

That nasal polypi often recur, and recur quickly, after removal is well knov
It is common for a patient to give a history of many minor operations for th
removal, spread over a number of years, and sometimes of frequent removals o
a much shorter period.

That nasal polypi occur most frequently in the allergic patient, and that infecti
is usually secondary to the obstruction, is not so well recognized. It is probable t
primary infective polypi are uncommon.

In an attack of allergic rhinitis, the symptoms are sneezing, watery dischai
and obstruction. The so-called "cold" comes suddenly, maybe frequently, I
clears up as quickly as it comes. In the active state the mucous membrane
swollen, congested and bluish and returns to normal after the attack. In cou
of time, after several attacks, the mucous membrane fails to return to nom
and is left pale bluish-white and œdematous. Small hypertrophies develop a
when these become waterlogged, potential polypi appear. There is no infectic
This type of polypus recurs frequently after even the most complete removal, a
for obvious reasons: there are any number of potential polypi in the many sm
hypertrophies. It may be possible to arrest their further development by desensi
zation and other anti-allergic measures, but in spite of treatment they may contin
to grow.

Treatment.—A number of cases have been published to indicate how tl
condition can be controlled. The polypi are removed and, three weeks lat(
radium needles containing a large dose of radium are inserted into each ethmo
capsule for a short time. This produces a reaction and eventually a sub-muco
fibrosis which supports or "splints" the mucous membrane, and a perivascul
fibrosis which prevents to some extent the bogginess of the mucous membrane.

The results of this treatment are good, and in cases in which there is no seconda
infection it seems to be an almost certain way of preventing recurrence.

In cases of allergic polypi, in which secondary infection has occurred, the resul
of the radium depend upon the completeness with which the infected sinuses ha
· been drained at the time the polypi are removed. It is dangerous to insert radiu

ss adequate sinus drainage has been provided, but when this has been done
um may safely be inserted and regrowth of polypi is again controlled, although
so certainly as in a clean case.

ASTHMA

re are three factors in the nose which definitely have a bearing on bronchial
sm and asthma:—

1) The so-called "asthmogenic area" or "trigger-area" in the nose is recognized
most rhinologists and allergists. Any part of the nasal mucosa, when stimulated
chanically, electrically, or chemically, may produce spasm of the bronchial
scle; this has been shown to be the case experimentally and, moreover, it has
n shown that with stimulation of the right side of the nose the bronchial spasm
l be mainly right-sided.

This trigger area is merely the most sensitive part of the nasal mucosa for the
ex. It consists of both medial, or septal, and lateral wall of the nose and is
stituted by the whole of the mucosa above the level of the lower border of the
ddle turbinate. It is bounded in front by the anterior end of the middle turbinate,
ning back to the sphenoid and even including the sphenoidal sinus.

There is no doubt that stimulation of this area mechanically by septal deviations,
rs, hypertrophies, by the presence of discharge or polypi, may often be the
iting factor in cases of bronchial asthma.

(2) The second nasal factor is sepsis, which may act by stimulating the nasal
cosa mechanically or indirectly by its toxic effect. Nearly everyone will agree
at in asthmatics the septic foci must be dealt with. Dramatic improvement may
obtained by drainage of an infected sinus, particularly if the sinus involved is
sphenoid or ethmoid.

(3) The third factor is any cause of nasal obstruction which gives rise to mouth
eathing, so that the air is not warmed, moistened or purified. Cold and dust-
len air goes straight down to the bronchi and may produce reflex bronchial
asm which, in an allergic, may initiate an asthmatic attack.

Nasal treatment in cases of asthma.—Any condition that may produce irritation
the trigger area must be dealt with.

Sharp vomerine spurs are dealt with by submucous resection or, in some cases,
r removing the spur locally.

Polypi should be removed and their removal will give an improved airway and
ill obviate another cause of local irritation.

Drainage of infected sinuses may be by simple puncture and wash-out, by intra-
asal drainage, or by more radical procedures. The choice will depend upon the
everity of the infection and every case must be decided on its merits by an expert,
s good results will depend upon the experience and judgement of the surgeon.

Cauterization of sensitive spots in the nose or ephedrine displacement may help
n some cases.

In all these allergic manifestations local treatments have been discussed and
re essential in the cure, or as an aid to the cure, of the sensitive patient, but, once
he aggravating causes have been dealt with, it is by specific anti-allergic measures
hat ultimate cure must be attained.

MALIGNANT DISEASE OF THE NOSE AND PHARYNX

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MALIGNANT disease of the nose presents a remarkable and fascinating study whether viewed from the standpoint of the surgeon or of the pathologist; and even to the anæsthetist it brings its problems.

The nose stands at the gateway of the lungs and two-thirds of its substance lie beneath the surface. Richly supplied by blood and lymphatics, it is a mass of caverns, passages and air cells, and its work in life is to attempt the purification the warming and moistening of the air breathed; air too often contaminated with carbon, chemicals and oil. It is no wonder that it is fairly frequently the seat of malignant disease.

GROWTH IN THE ETHMOID

The ethmoid, with its labyrinth of vascular air cells, is usually the seat of origin and a vascular polypoid mass is formed in that situation—a growth which readily becomes infected and gives rise to a nasal discharge of pus and blood. Soon the confines of a limited space are felt and the growth quickly breaks through into the antrum.

DIAGNOSIS.—In the early stage diagnosis is difficult. No warning or pain is experienced, and usually the only symptoms are a sense of nasal obstruction and discharge of blood and pus. Thus it frequently happens that the diagnosis is not made until complicating extensions have taken place.

Once invasion of the antrum has occurred, the growth rapidly increases in size and severity. It readily breaks through the anterior wall of the antrum to invade the cheek—upwards and outwards to involve the muscles around the malar bone— upwards through the infra-orbital plate to bulge into the orbit. Lastly, the most serious extension is backwards through the posterior wall of the antrum to enter the spheno-maxillary fossa with its rich supply of blood vessels and lymphatics and at the same time invasion of the sphenoidal sinus takes place.

The lachrymal duct and sac are frequently involved, and the growth even passes up this tract to affect the skin below the inner canthus of the eye. The frontal sinus is never affected, although it is often filled with pus. Sometimes the disease passes through a tooth socket to appear on the alveolus or bulges through the palate.

Clinical signs.—The diagnosis at this stage can be made across the consulting room; a swollen and distorted face, the nose thickened and broadened; an eye often bulging and generally fixed or at least showing deficient movement; and yet—no pain. Emphasis is laid on this absence of pain, for it is a myth firmly held by the patients and many practitioners that "It can't be cancer because I have no pain."

le microscopical appearances of these tumours vary greatly and are often
cal. In children and adults there are clear-cut sarcomas; in adults there are
which are rightly labelled columnar celled carcinoma, others spheroidal
l, but the majority are described as endotheliomas.

le *age incidence* is widespread and quite a number appear in young children.
se stands out which illustrates this:—

se 1.—A boy, aged six, was sent up with epistaxis for removal of tonsils and adenoids.
ew of the history a post-nasal examination by the finger was made before applying the
te. The nasopharynx was full of soft, rapidly bleeding sarcoma.

lands are not involved unless the tissues of the cheek are implicated.

REATMENT.—When treatment is under consideration the field of controversy
itered and, although an attempt will be made to state the position fairly and
·ly, I may perhaps be forgiven if I state my own views rather dogmatically.

he growth can be treated by (1) radiotherapy alone; (2) by surgery of access
. subsequent implantation of radium; or (3) by surgical excision combined
l diathermy.

'he principle of treatment of *sarcoma*, which is extremely radio-sensitive, is to
ay the growth away but ever so slowly." Professor Russ, of Middlesex Hospital
·cer Research Department, many years ago pointed out to me that the absence
firm reticular stroma in an active sarcoma made it particularly liable to dispersal.
. experience made this only too clear, for in the early days of the use of radium
·as the custom to bury a 50 mgm. tube in the substance of a sarcomatous tonsil.
e result was remarkable but tragic: the sarcoma disappeared in a night but
irned in numerous scattered nodes in various parts of the body during the
uing weeks.

The best treatment is by X-rays only, and surgery has no place. The radiation
st be given slowly, and if radium needles are inserted they must consist of not
re than three or four needles left in for the requisite time.

n the case of the more common type of *epithelial malignant disease* of the nose,
nore complicated question of treatment arises. A few cases of purely local
lignancy and limited extent arise from the septum and are easily recognized in
early stages by the patient, from his sensation of obstruction. These are best
llt with by a local excision to be followed by a course of X-rays or radium beam.

The advanced case.—The great majority of cases of malignant disease are rarely
·ognized in the early stages and not until the extensions have taken place does
· seriousness of the condition become obvious. The surgeon is then confronted
th the problem of the eradication of a growth which has extended in many
·ections with numerous finger-like processes, and the whole is intersected and
·xed up with bone. It is impossible by external radiation to give a lethal dose to
· whole growth and at the same time to avoid a necrotic dose to the bone. It is
ll more impossible by the use of the surgery of approach to insert radium needles
fficiently accurately to destroy the whole growth and *nothing but the growth*.

The best results are obtained by the use of surgery and diathermy. It is true that
is impossible to excise the whole growth together with a satisfactory margin of
·althy tissue—the anatomy of the part renders this impossible. Again, the classical

textbook operation for removal of the upper jaw is inapplicable and each case m be studied and planned in the light of the clinical findings and the X-examination.

The normal practice is to turn the face aside by an incision beginning in external eyebrow and directed down the side of the nose, below the naris through the midline of the lip. The upper jaw is then removed by first cut through the lines of bony attachment and the mass, consisting of the ethmoid, wall of the nose and as much of the deep extension of the growth as possil is gently and quietly eased away. Some extensions will be found to have been behind, and these are dealt with by the diathermy fork, the charred tissue b nibbled away by a pair of punch forceps, used alternatively with the diathermy f to remove the growth until healthy tissue is reached. The palate is remove involved—otherwise it is left; but provision must be made for efficient inspe of the operation area, and for this reason an oblong opening is generally cut in hard palate to be later covered by a dental plate.

The operation is carried out in a sitting position in an operating chair, with ligature of the carotid artery.

Prognosis.—What is the prognosis of this rather drastic procedure? The opera mortality is surprisingly low and pneumonia is quite rare. The recurrence rate fairly high, as might be expected, for it is anatomically impossible to excise growth completely. These recurrences are not a matter for serious anxiety.

The patient must be kept under regular observation in the follow-up cl· and provision is always left at the operation for adequate inspection of the affec area. A recurrence must be dealt with promptly and treated by diathermy.

Lastly, the whole area should be irradiated by X-rays, but the effect of may well be to increase the sepsis and delay healing, unless the radiation delayed until fair healing has taken place.

Although extensively used in Sweden, and by many surgeons in this coun it is not wise to insert radium into the nose or upper jaw, either on a rubber plac or in a sorbo-rubber ball. It is impossible to irradiate evenly and effectively su a large and irregular cavity; sepsis is encouraged and radium necrosis not inf quently occurs.

The diathermy electrode produces a limited local area of necrosis, the size which can be measured and foretold, which never extends and eventually separat Beyond the area of radium necrosis is an ever widening area of endarteritis, v an extending death of the bone. The dose of radium applied to the part measured accurately by the physicist, and yet cases of radium necrosis all t frequently arise. The following case, treated in the early days of radium, twee years ago, died of radium necrosis and well illustrates the danger:—

Case 2.—W.D., aged fifty; bank manager. The patient had an extensive and epithelioma of the ethmoid, involving the maxilla. He was treated by excision and a 50 m tube was packed in the centre of the resulting cavity. He lived for ten years and never a recurrence of growth. But radium necrosis developed: the bone around the cavity be blackened and offensive and the trouble progressively extended. Later his eye drop and subsequently had to be removed, and finally he died of acute cerebrospinal press from involvement of the meninges.

THE NASOPHARYNX

ilignant disease of the nasopharynx the usual growth is an epithelioma, and
erally begins on the lateral wall well above and around the Eustachian cushion.
toms are again few. There is probably some obstruction to the nostril on
ffected side, blood-stained nasal discharge, deafness following obstruction to
ustachian tube, and the ear itself may be infected and otorrhœa result. Lastly,
ew cases growth has extended through the drum.

e growth is radio-sensitive, but the difficulty is mainly one of the effective
cation of radium to the area. The region of the Eustachian tube is dealt with
radium plaque on rubber, a radium ball pushed up into position by a post-nasal
soaked in bismuth and iodoform, and all the strings drawn through the nostril
e same side. An operation has been practised and carried out in which an
pt is made to reach the pharynx from without, in order to give external
tion. In the sitting-up position the approach is across the antrum, through
osterior wall into the spheno-maxillary fossa, at the same time removing the
nal pterygoid plate. The position of the growth is checked by a powerful bulb
duced into the nasopharynx in a completely dark theatre, and a pretty red
 is seen in the deepest part of the wound with the shadow of the growth out-
l clearly. A radium plaque is placed in the depth of the wound and another
he nasopharynx, with a resulting cross-fire of radiation. The operation is
tive but somewhat severe.

he prognosis is good, provided that an efficient and evenly distributed dose of
um is placed in position and retained there for the requisite time.

he most fatal complication is one in which an extension takes place through the
is of Morgagni, that is through the weak area high up in the lateral wall of the
rynx and then through the foramen lucernum medium to enter the cranium.

ase 3.—A school teacher, aged thirty-five, had an epithelioma of the nasopharynx.
 was treated by a radium plaque. The growth showed a good reaction and finally dis-
ared completely. Six months later she complained of pain for which no cause was
ent. In a few weeks paralysis of the 6th nerve and then of the 3rd followed. She died,
 extensive erosion of the petrous bone was found, but there was no recurrence in the
rynx.

arcomas of the nasopharynx also occur and may give rise to severe hæmorrhage.
ey are best treated by X-rays, but ultimately are often fatal.

Malignant disease of the oral pharynx is practically invariably squamous epitheli-
a and it is unexpectedly radio-sensitive. Growth generally takes place on the
ral or posterior walls and, provided it does not encroach on the larynx, can be
ectively dealt with.

Symptoms are few and may be absent. Of pain there is none, nor is there any
struction to swallowing unless the growth is situated in the hypo-pharynx.
 a rule the first and only sign is a gland in the neck, which rapidly becomes
perable.

Surgical excision, so ably advocated by that great pioneer Wilfred Trotter,
 now largely given place to the application of radium. The real key to the
uation is whether the affected glands in the neck are operable or not, although
 question of operability may vary with the skill of the surgeon. An early diagnosis.
necessary and the glands come up very rapidly.

At operation the glands of the anterior triangle are excised, the external ˌ ˌ artery tied and the lateral wall of the pharynx exposed. The growth can ofte felt, but again a small but powerful bulb is inserted into the pharynx in a d͏ar' theatre and the clear outline of the tumour is seen. Radium plaques of suitabl͏ and shape are sewn to the outer side or back of the pharynx to cover completel͏ irradiate the growth. The pharynx is not opened and no leakage or sepsis ˌ The radium is well tolerated, except when a plaque has to be inserted behin͏ pharynx, when considerable shock may result. The mortality is low and the are well worth while.

Malignant disease of the hypo-pharynx is a different matter. In this ͏ there is a funnel-shaped tube narrowing to its base at the sphincteric entrance t œsophagus. Here dysphagia is common and may become acute and yet, despit͏ fact, early diagnosis is not usual and often again the enlarged gland is the first of trouble.

The part is very vascular, and a growth rapidly encircles the tube and ˌ adherent to the back of the larynx: in fact it often starts on the back of the · part of the cricoid.

In this situation, radium is badly tolerated and operative shock is ͏r-ide͏ Laryngectomy must be considered and in selected cases can be effectively' ˌ out with success. It requires courage on the part of the surgeon to recom͏ the drastic procedure of removing an apparently healthy larynx in order to o access to and remove or irradiate a retro-laryngeal growth: and how much for the patient who is so required to face a drastic operation followed by a manent voicelessness ! It is unnecessary to say that this advice is rarely ˌ and still more rarely accepted. The following case shows the possibilities

Case.—Male, aged fifty-six, good general condition with an extensive ret͏ ' ˌ growth encircling the lower pharynx. The larynx and pharynx were excised gastrostomy and plastic operations were carried out to restore the pharynx. He liv͏ ten years afterwards without recurrence, and quite happily.

The majority of patients are treated with radium beam. The results ar͏ good—some are ameliorated and some remain untouched. The lower the ͏' the worse the outlook and carcinoma of the sphincter at the entrance o œsophagus is incurable by any of the means available.

THE TONSILS

In reviewing this subject, malignant disease of the tonsils, which so often ˌ · the pharynx, can hardly be excluded. In this situation again, by far the common growth is an epithelioma, but sarcoma not infrequently occurs, ˌ͏ a mixed parotid tumour is by no means rare. The latter forms an ͏˗ slowly growing, painless tumour, which may give rise to difficulty in speech obstruction to swallowing. Radium and X-rays cause a slight shrinkage and the growth in check but never cure it. The best treatment is surgical enu͏' ˌ but it is advisable first to tie the external carotid artery. The operation is labo͏ and often quite as hard as a difficult prostatectomy, but it is frequently effectiv͏ the result is all that could be desired.

coma of the tonsil is as serious as is sarcoma in a long bone, and as deadly.
appears quickly, perhaps all too quickly, by the action of radium needles,
n beam or X-rays, but reappears in the glands, the lungs and the mediastinal
s. It is frequently fatal.

e best treatment is by X-radiation slowly given, not only to the primary focus
ɔ the neck, but by prophylactic irradiation of the chest and other gland fields,
as the axillæ and groins.

ithelioma of the tonsil is a relatively common form of cancer. Starting in the
i itself, it readily spreads upwards to the soft palate and uvula and downwards
ʒ adjoining portion of the tongue. Less commonly it extends forwards, and
ɪt position is very close to the ascending ramus of the jaw.

eatment is by radium needles: long needles are used containing 2 mgm. of
m, 45 mm. long, screened by ½ mm. of platinum. They are placed 1 cm.
and each is tied separately. Special attention is given to the tongue, and the
er area lies in the sulcus between the tonsil and the tongue.

those extensive cases in which the growth has extended forwards on to the
ᶳ and approaches the mandible, it is unsafe to insert radium needles without
removing the bone. In dealing with this position an operation has been devised
removal of the affected ascending ramus from the angle upwards and the
ication of a radium plaque from the outer aspect, in addition to needles placed
in the mouth. This removal of jaw does not give rise to any deformity and,
ɪge as it may seem, the patient can open his mouth freely and masticate at will.

he treatment of the *gland fields* is a matter for debate. Should the gland fields
ubjected to a block dissection in all cases or only when glands are present?
ɪld the glands be first excised or radium in the first place inserted into the
ɪary focus? If infiltrated glands are felt they are removed by block dissection
the external carotid artery tied. A week later the needles are inserted into
growth. It is found that stirring up the growth by irradiation may make the
ds, previously operable, quite inoperable. If there are no palpable glands,
entire glandular fields are given a course of prophylactic X-rays.

uite a number of cases with or without X-radiation, never give rise to
dular enlargement, but when enlargement occurs, glands come up quickly
rapidly become inoperable.

he prognosis for carcinoma of the tonsil is good and represents one of the
mphs of modern radium therapy.

he principles which govern radium application to-day are fully worked out.
ɛre must be regular and even distribution of the needles; each area must have
correct dose and this is checked by measurement by the physicist to the
ɪartment. Care must be taken that some of the needles do not come out
maturely. If some of the needles fall out before the measured time, part of the
wth is insufficiently irradiated and part of the tumour may even be stimulated;
ilst if the remaining needles are left in for a longer period to make up the
essary radium hours, a local necrosis may ensue.

Although measurement by physical means with the needles *in situ* represents
advance, it is by no means infallible. The liability to necrosis varies with two
tors. The first anatomical—bone is more vulnerable than soft tissues and it is

necessary to give the physicist information of the precise distance betwee
radium needles and the bone; all bones are not alike, and it appears tha
sphenoid bone and pterygoid plates are particularly vulnerable. Soft tissu
varies widely and its reaction to radium depends mainly upon the vascular
Muscle is but little affected, whilst fibrous tissue and fascia are easily dan
The second factor is the blood supply, and the condition of a man's arter
often the dominating question.

CONCLUSION

In this brief review an attempt has been made to indicate the new growths
appear in the nose and pharynx, together with the modern treatment and its r
It is, however, not sufficient only to view the tumour and its operability and
condition of the patient will be in after operation, nor even to examine the
and decide as to their operability. The practitioner must view the patient f
broadest medical standpoint.

The history of alcohol, syphilis or tobacco is important. Tobacco in
renders anæsthetia difficult and subsequent pneumonia probable. Syphilis
vates the rate of growth but is not fatal; treatment of the growth is "
and at the same time that of the venereal disease. Of the three, alcohol is th
lethal; malignant cells roaming about in tissues soaked with alcohol find t .
in paradise; there is little hope of a cure by operation, radium or X-rays
habitual alcoholic.

The condition of the heart and blood pressure is all-important. M
anæsthesia with its gas-ether-oxygen narcosis strongly stimulates the hea
maintains the pulse during the operation, and gives an altogether artificial a
ance of strength in the patient. Back in the ward the scene changes, and such
may easily fail.

The state of the lungs must be investigated and clinical and X-ray   "
made to demonstrate excessive fibrosis, latent pneumonia and secondary · "
deposits.

From these considerations, and in view of the surgical procedure ʳ ·
has the patient a reasonable chance of getting through with it? Does he · ˙
the risk, as well as the necessity for it, and is he willing to take that risk?

The mental attitude of the sufferer has to be taken into account. One
will prefer an operation even "if I go under" rather than face death fror
malignant disease, and that courage, which makes him so decide, will do
to carry him through the ordeal in safety. For those of poor spirit, who easi
up, a comparatively small operation may well prove fatal, as they show no
with which to face it. The surgeon would be wise to go into the anæsthetic
just before operation and speak a word of hope and resolution to his patient
always appreciated, and may well turn the scales.

Finally, should radiation be offered to the inoperable? It is a sad task
practitioner to tell his patient that nothing can be done for his condition.
prospect of treatment, even if only to give amelioration, brings consolation
practitioner and more than a ray of hope to the invalid. It is worth while.

OBSCURE PYREXIA*

By C. H. STUART-HARRIS, M.D., F.R.C.P.
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ᴀLL cases of pyrexia are obscure until the etiology of the fever has been
lained, and therefore the subject of this article is significant because it so
quently provides a problem. The significance of obscure pyrexias as an Army
blem may be illustrated by a recent experience in the field:—

The patients were suffering from fever with signs of involvement of the respiratory tract.
ere were sufficient numbers (40 or more in a week) for the incident to be described as
outbreak, but the cases were scattered throughout many units so that the incidence was
radic rather than epidemic. The fever lasted from five to ten days on the average, during
ich time the men were quite ill, with general symptoms, such as headache and muscular
ns. Although there was little upper respiratory coryza or sore throat, in most cases
igh and pain in the chest, often as an initial symptom, were present. There was often
istory of exposure to cold or damp before the onset, which was frequently acute. The
st signs were variable. A few had no abnormal signs; most had areas of fine râles,
ally at the base but sometimes in the axillæ or over the apices of the lungs. Percussion
llness was uncommon but present in one or two cases; frank bronchial breathing localized
small areas was present not infrequently. In one or two cases there was pleural friction
signs of fluid in the pleura.
The problem which these cases presented was, first, whether or not they were manifesta-
ns of an acute epidemic infection, such as influenza, which might spread rapidly among
₂ troops and cause difficulty in military operations and, secondly, the diagnosis was
eded to control treatment, particularly in view of the possibility that the group consisted
several different types of case. The fact that in many cases there was fever of more than
e days' duration and that there was little or no evidence of infectivity or spread from
se to case suggested that influenza virus infection was not the cause.
X-ray examination of the chest was carried out in many of the cases and the findings
dicated that some form of pneumonia was present in most, but, although some skiagrams
uld have been compatible with lobar, or broncho-pneumonia, the leucocyte counts, even
these cases, were within normal limits. Many of the skiagrams were not typical in
pearance of bacterial pneumonia, and some cases without any clinical signs of chest
volvement had veiled areas of opacity in the lung spreading out from the hilum. These
early seemed to belong to the group recently described as "atypical pneumonia." An
lditional point against a bacterial etiology in these cases was provided by a therapeutic
st with sulphapyridine which did not produce any benefit. Further investigations of the
utum for pathogenic bacteria and examination of the serum for the antibody causing
glutination of human red cells in the cold were suggested. If the cold red cell test showed
' all cases a rising titre of agglutination during the progress of the disease, such as has been
monstrated in several different areas where atypical pneumonia has been studied, the
ew that all the cases were manifestations of atypical pneumonia would have been
rengthened. Needless to say, the geographical location of these patients when they fell ill
ad led to the exclusion of malaria by repeated examination · f thick blood films before
itegorization as "obscure pyrexia." A solitary patient admitted at this time with fever,
eningism, mental symptoms and without signs or symptoms in the respiratory tract, was
or a time suspected of typhus. He was severely prostrated, had a few pink macules on the
odomen but no conjunctivitis or enlargement of the spleen. An enthusiastic medical officer
otained an X-ray of the chest and a classical picture of atypical pneumonia was found.
he rash did not develop, the Weil-Felix reaction remained persistently negative and the
bsequent clinical course indicated the correctness of the radiological findings and
iagnosis.

* A lecture delivered at the British Postgraduate Medical School.

investigations not of a routine nature, such as the need for a radiological . ᴀₙᵎ
tion if the chest is involved, and there is therefore much need for careful · ᵤᵎ
and complete examination in all cases of obscure pyrexia.

(II) *LABORATORY INVESTIGATIONS.*—The second principle must bᵉ
select the particular laboratory investigations with care, so that the most apₚₗₒₚᵢᵢ
methods in the individual case may be chosen. The methods used in the lab ᵢ
in order to demonstrate the diagnosis in cases of pyrexia can be simply ᵣₗₐₛₛᵢᶠ
into one or other of the following groups:—

(1) The first group includes those tests in which tissue changes charaᵤᵢₐᵎ
of a particular type or group of infections are sought. Examination of ᵢ
blood cells, of the bone marrow, biopsy of tissue or study of the ₛᵢₘᵣ
cellular characters of body fluids or excreta, all fall within this ᵤₐₜₑ₉ₐ
Changes demonstrable by biochemical methods, such as the van ᵎ
Bergh and blood urea tests, may also be grouped here.

(2) The second group includes tests which demonstrate the presence of ₚₐₜᵢ
genic organisms in blood, body fluids, secretions or tissues. This ᵥ
include tests of blood for parasites by direct film, examination of ᵢ
marrow or spleen for parasites by puncture, dark ground exaᵥₙ ᵢᵢ
of the exudates from tissues or in urine and the whole of the ᵢ ᵎᵎᵎ
logical methods devoted to the isolation of bacteria or the demonstratᵢ
of the pathogenic effects of viruses in animals.

(3) The third group is the demonstration of specific immunological chₐₙₗ
in the body which are characteristic of particular infections. This ᵎ
include tests as diverse as agglutinations, precipitation or flocculatᵎ
reactions, complement fixations and tests for neutralizing antibc ᵎ

Blood.—The blood count is of such importance that full examination willᵎ
made in all cases of pyrexia, but although the leucocyte count may help to diff
entiate, it will not usually be crucial in its significance. For example, the ᵉᵥᵎᵎ
of a leucocytosis is in favour of a coccal rather than of an enteric infection ᵎ
normal white cell count does not rule out infection by the typhoid bacillus.

Next in importance to the blood count is the examination of a thick bloodᶠ
for the presence of malarial parasites. The same technique will also reveal spᵎ
chætes of relapsing fever. Thirdly, comes blood culture, which is of such ᵎ ᵎᵎᵎ
importance in the diagnosis of enteric fever and which will also demonstrateᵎ
causal agents of all the different types of bacteriæmia. Suitable media are essᵤᵎ
for blood culture and media containing *p*-aminobenzoic acid must be used if
patient has already received treatment with sulphonamides.

Finally, the use of animals for the recovery of organisms not cultivatable
ordinary media must be mentioned. The guinea-pig is the final diagnostic ᵎₑ
in typhus fever, because by inoculation of blood into this animal a characteᵎ
fever may be invoked and rickettsiæ may be demonstrated, either directly or ᵎ
passage into mice or into the yolk-sacs of developing hens' eggs.

Serum.—Agglutination tests using standard bacterial suspensions are the ᵐ
readily available tests for serum antibodies, but they must be used to demonsᵎ
changes in titre of antibodies rather than mere presence in the serum. No beᵎ
example could be given of the value of agglutination tests than the Weil-Fᵎ

in typhus. The proteus OX group of organisms apparently shares antigens with the rickettsiæ, so that changes in the titre of agglutinins for the proteus organisms occur during the course of typhus. The OX 19, which is the particular proteus concerned in European or epidemic typhus, is not normally agglutinated by human serum, but some individuals possess a low titre of agglutinin for OX 19, and this titre may undergo slight rise during fever from any cause. The rise is, however, trivial in extent and is at its height during the early days of such fever, whereas the highest titre in typhus is developed towards the end of the fever during early defervescence. In spite therefore of the risk of misdiagnosing some rare cases of typhus with poorly developed antibody response it is well to insist on the demonstration either of a rise in OX 19 titre of four-fold or more during the progress of the disease or of agglutination to standard degree at a dilution of the serum of 1 in 200 or more, before acceptance of the case as one of typhus fever. The action of vaccination of an individual against typhus fever does not at present cause confusion, as individuals respond to the vaccine with either trivial increase of OX 19 agglutinin or no increase at all, and the same criteria therefore hold for vaccinated individuals as for the unvaccinated. In scrub typhus of the South-East Asia area the OX K proteus is used just as is the OX 19 in European typhus, and the tick-borne typhus of the Mediterranean littoral (fièvre boutonneuse) may often be diagnosed by demonstration of a rise in agglutinin for the OX 2 proteus. The actual causative rickettsiæ are now being employed as suspensions for testing for serum agglutinins, but although rickettsial agglutination is a useful procedure it has not yet supplanted the Weil-Felix reaction, chiefly because of the simplicity of the latter test.

Other diseases in which the agglutination test is employed are the enteric group of fevers mentioned below, and infections by the *Brucellæ* and the *Leptospira*. In the latter, recovery of the causative organism is often a matter of extreme technical difficulty and the agglutination test with standard suspensions gives good results. The diagnosis of dysenteric infections is not helped by the performance of agglutination tests.

Turning now to other antibodies capable of demonstration, the Kahn test employs the principle of the flocculation reaction, and the complement fixation reaction is not only of use in syphilis but with appropriate antigens it is used in the diagnosis of psittacosis, of choriomeningitis virus infection, of influenza, and perhaps also in a small proportion of cases of atypical pneumonia. Neutralizing antibodies which are of such vital importance in the recovery from infection are of less importance in the diagnosis of infections. Yellow fever and influenza virus infection are, however, both examples of diseases in which the neutralization of the respective viruses by the convalescent serum, but not by serum taken early in the course of the fever, is significant of infection.

Heterologous antibodies not definitely known to be related to the causative organisms of the disease are useful in the Paul-Bunnell reaction in glandular fever and the cold red cell agglutinin test for atypical pneumonia. The use of the formol gel test for the diagnosis of kala-azar may be tried in cases of splenomegaly in patients returning from the tropics or Mediterranean.

Urine, fæces, sputum or cerebrospinal fluid.—Examination of the urine, fæces,

the bend of a road, omission to detail bystanders to take up suitable posit
so that they can regulate oncoming traffic may be the cause of a further diss
Many other sources of danger may be mentioned, for example, the risks of
in motor-cycle accidents and the dangers caused by poisonous fumes, escaping
and an exposed current of electricity.

Arrival.—On arrival, the first-aider should instruct his patient to lie still,
should invite the cooperation of the bystanders to prevent him from being mo
until instructions are given. It is surprising how often this rule is broken. It se
to be almost a human tendency to move a patient immediately after an accid
and usually for no obvious reason. There are occasions, of course, when imme
removal is essential—for example, when fire is present or when the accident
been caused by heavy machinery—but whenever possible a quick examina
should be made to determine probable injuries so that the affected parts can
carefully supported during removal.

A point that is often forgotten is to ask, whenever possible, for permissio
attend the patient. Similarly, if during the course of treatment it becomes n
sary to cut clothing, permission should also be obtained.

Initial examination.—On arrival, the first-aider should halt a few paces a
from his patient in order to obtain a general outline of all the circumstances c
nected with the case. He should notice particularly the need for life-sa
measures, e.g., the presence of asphyxia.

A common error on arrival is for the first-aider to kneel down immediate
the patient's head and waste valuable seconds testing consciousness and the l
while all this time blood may be escaping unnoticed from another part of the b
A short visual examination from a distance prevents the risk of failing to no
a dangerous condition. At this stage it will not come amiss to mention th
good colour of the face does *not* mean that a patient is unharmed in coal
poisoning. It is a characteristic feature of asphyxia due to this agent, for
colour of the skin and mucous membranes to be pinker than normal.

IMMEDIATE ACTION

Early treatment of shock.—First-aiders are rightly taught to begin treatment
shock as soon as possible; but this instruction is often neglected and sir
preliminaries, such as covering the patient, are often postponed until treatmer
the injuries has been completed. A good first-aider remembers to instr
bystanders to obtain suitable wraps, hot bottles and a warm drink almost as s
as he arrives at the incident.

Covering of the patient must be complete, yet how often is it noticed—eve
hospital—that a patient, although wrapped in blankets, has an extensive are
his skin visible at the side of his body! It is, however, a serious mistake, accor
to modern teaching, to attempt to warm a patient too quickly.

Multiple casualties.—When several persons have been injured as a result
single accident, it is necessary to make an immediate survey of all the pat
and decide on the order in which they should be treated. It is easy to slip u
this point, and on discovery of a relatively serious case to forget temporaril
importance of having a quick look at the others. In this connexion the valu
intelligent bystanders must not be forgotten, for they can be quickly shown t

support, for example, an injured limb, thus providing some treatment, at any rate until the more serious cases have been dealt with.

Removal of patient.—Arrangements for disposal of the casualty must be made early in case-taking, and an ambulance, if required, should be sent for immediately, so that its arrival will anticipate the completion of treatment. Failure to remember this point may leave the first-aider in an invidious position, for there can be nothing more embarrassing than having to wait by the side of a patient whose treatment has been completed, pending the arrival of the ambulance which could easily have been obtained much earlier. Sometimes, removal of the patient should be purposely delayed, but the decision depends entirely upon the environment and the facilities available. It is an error of judgement, for example, to remove a case of cerebral hæmorrhage immediately, when there are facilities for providing temporary treatment on the spot. Similar errors occur through removing too quickly certain cases of shock, hæmatemesis and hæmoptysis.

An old rule, so often omitted, is to warn a hospital in advance to expect the arrival of a casualty, supplying some details of the nature of the case. In these days of shortage of house surgeons, it is a courtesy which should certainly be remembered, particularly for the smaller hospitals.

DIAGNOSIS

Any diagnosis that is made in first aid is only intended to be provisional. It is sufficient to appreciate the most serious possible injuries which may have been sustained and to treat them as if present until there is an opportunity of investigating the case more thoroughly under more suitable conditions, and when the patient has recovered from shock. It is an error to spend longer than is absolutely necessary to establish such a diagnosis. This limitation on the scope of diagnosis, however, does not excuse the need for a complete examination, although it may, and in fact should, be cursory. Short cuts should be employed whenever possible.

A common mistake is to be content with finding one injury and to curtail the examination at this point. Owing to the intensity of pain and the severity of shock, a patient (e.g., one who has broken his leg) may not realize that he is suffering from other injuries which for the moment are causing him less pain.

Unnecessary exposure of the patient when examining is strongly condemned. The examination should be conducted in such a manner that the greater part of his body remains covered during the process. Thus blankets can be partially removed to expose individual parts of the body, which are then re-covered as soon as examination has been completed. It is scarcely ever necessary to undress a patient at an incident; it is quite possible, in the majority of cases, to examine him through his clothing. Wounds provide the only exception to this rule, but their presence can usually be detected by marks or dampness on the clothing.

The importance of examining the back ribs, scapulæ, and spine is often forgotten. This should be done with as little movement as possible, great care being taken when turning the patient on to his side to roll the body as a whole and to use the services of a bystander to maintain this position while the examination is being conducted.

FRACTURES

Diagnosis.—First-aiders are taught the usual list of symptoms and signs of a

fracture, namely (1) pain, (2) loss of power, (3) swelling, (4) deformity, (5) unnamobility, (6) tenderness, and (7) shortening. Insufficient emphasis, however, is!
on the presence of shock and its value as a diagnostic sign. If, after an accider
patient complains of severe pain in a limb and obvious shock is present, i.
sufficient for first-aid purposes to assume a fracture, and all that is required he
beginning treatment is to determine the probable seat of injury. This can
be detected by inspection, which should always precede palpation—a point th:
frequently forgotten, as is also the value of comparison with the opposite side.

The importance of tenderness as a physical sign is often undervalued; it
hardly mentioned in some of the standard first-aid books. Often it may be the
sign present initially, especially if the fracture is of the fissured type. It mus
taken as a golden rule that if, after any accident, an area of tenderness, howe
small, is discovered along the course of a bone, the presence of a fracture
be assumed and first aid provided until the diagnosis is confirmed or
by X-ray. Failure to observe this rule is responsible for many mistakes in med
work, especially with fractured fibulæ near the ankle, small bones of the la
and feet, and sometimes even of the spine.

Treatment.—The first principle is that directly a fracture is suspected, either
history or symptoms, the affected part must immediately be steadied and suppor
until examination of the patient has been completed, and until the injury has
suitably secured. This is a rule which is too often broken, and not only by
lay first-aider! It is not uncommon to see—even in the casualty depar
a hospital—an obvious fracture being left unsupported while equipment is
or further examination of the patient undertaken.

The methods of treatment employed in first aid for fractures of individual
have been much criticized by medical practitioners during the war. Unf
however, the criticism has been chiefly destructive and, although practitioners
are extensively engaged in the teaching of first aid are only too happy to learn
new methods, few suggestions of value have come forward to justify any dr
changes in the standard methods. In this connexion it must not be forgotten
first-aid procedures are designed for their simplicity, rapidity of application,
to conform to the general principles of first aid, of which one of the most imp
is that the affected part shall not be moved during treatment.

It is impossible to discuss in detail the numerous errors which are made
elementary students in the treatment of fractures of the individual bones. Mist
such as omission to apply slings for fractures of ribs, and indeed for all fr
of the upper limb, are soon recognized by the medical instructor. A big poin
made of the importance of making sure that the circulation has not been obstru
by tight bandages, as in the three-handkerchief method for a broken collar bone.

Serious errors occur in the treatment of lower-limb fractures, particularly of
fractured femur. Here the first step in treatment is to straighten the everted
and then to apply manual extension, drawing it downwards into level with
fellow of the opposite side; to this it is then secured by means of a figure-of-
bandage round both feet and ankles. A fault which must be avoided at this
is to leave go of the injured foot, even for a second, until it has been secured

Once the feet have been tied together, there is no need to move the injured li
hence the first-aider has no time for the common medical method in which

is partly flexed while it is being secured to a long Liston splint by means of
·ller bandage. Exactly the same principle applies in fractures of the leg.
: should be noted that it is an error to apply extension in a compound fracture.

BURNS

takes occur chiefly through failure to distinguish cases which require active
tment from those in which first aid should be restricted to bare essentials.
erience shows that in civil life all except minor burns fall into the latter category.
irst aid for severe or extensive burns should be confined to morphine, treatment
shock, and speedy removal of the patient to hospital. Any attempt at more
bitious treatment must be strongly deprecated, except in cases in which there
kely to be delay in reaching a centre where medical facilities are available.
this event, first aid should include the immediate application of 1 per cent.
-ian violet or triple dye jelly (triofax). This should be applied without previously
nsing the burn.
. serious problem in first aid for severe or extensive burns is: who is to give the
phine ? Obviously the lay first-aider cannot be allowed to, but what of that
-growing body of trained nurses, many ex-hospital sisters, who are now
bonsible for the first aid which is undertaken in the factories? As the law stands,
cks medical officers are precluded from supplying their nurses with this, the most
ortant remedy required for the treatment of burns. Some medical officers
round the difficulty by supplying an anti-shock mixture containing tincture of
proform and morphine (equivalent to 1/8 grain) to be given by the mouth in
emergency.

WOUNDS

te chief error in the treatment of wounds lies in attempting to do too much when
facilities are unsuitable. Thus the thorough cleansing, probing and stitching
wounds does not come within the scope of true first aid, which should be confined
the application of a temporary dressing.
uitable dressings, similar to the "first field" can be obtained under the titles
'standard dressings, nos. 1 and 2, N.H.I." No. 1 is made from sterilized gauze
no. 2 from lint; the dressings are put up in packs ready for immediate use.
· larger wounds, mine dressings, made of gamgee, are most valuable. First-
ers are taught, before applying the dressing, to paint the wound and sur-
nding skin with an antiseptic, such as dettol or surgical spirit. This, in
average case, is quite unnecessary and is better omitted, except when there is
ly to be considerable delay in obtaining medical facilities. If, for any reason,
vever, painting or cleansing of a wound has to be undertaken, the common error
swabbing from the skin inwards towards the wound instead of *vice versa* should
avoided.
Removal of foreign bodies is another subject on which a word of caution is required.
en the foreign body is lying loose in the wound, there is no harm in removing it,
if there is any question of it being imbedded—particularly if along the course
an important blood vessel—it may be asking for trouble to remove it in the
ence of facilities to control a profuse hæmorrhage which may follow.
When a foreign body, such as a needle, breaks, leaving a fragment under the
n, a rule of first aid—often overlooked—is to preserve the remainder for inspec-

tion so that the surgeon will have some idea of the size of the fragment for w'
he is seeking.

<div align="center">HÆMORRHAGE</div>

First-aid methods for stopping bleeding can be classified as follows:—

(1) Direct pressure: (a) Digital.
                       (b) Pad and bandage.
                       (c) Ring pad.

(2) Indirect pressure: (a) Pressure points.
                       (b) Tourniquets.
                       (c) Flexion and other methods.

It will be readily understood that with so many methods, errors occur, no:
through faulty application but also through failure to appreciate their indicatio:

Direct digital pressure.—Pressure with the fingers directly on a wound is gene·
successful. It is, however, only of value as an initial procedure, and for this r·
alone is undesirable, except in the extreme emergency; it does not give the
aider any opportunity of examining the wound before it is applied; more.
it is often undertaken without any consideration of cleanliness, e.g., inte ·
a suitable dressing between the finger and the wound. In any case it can
be used for wounds of limited size.

Pad and bandage.—Direct pressure with a pad and bandage, e.g., a mine dr ·
is without doubt the best method of maintaining control of bleeding. It mus·
be adopted, however, until the wound has been examined to exclude the co·
indications; these are the presence of a fracture or a foreign body. For this re·
it cannot be used as an immediate procedure.

If use of a pad and bandage does not appear to have been successful, as sh·
by the oozing of blood through the dressing, it is a mistake to remove it and ap·
another; a second pad and bandage should be placed over the first and secu·
even more firmly. Deep wounds, however, may have to be packed with g·
up to the surface before the pad and bandage is applied.

Ring pad.—This is a method which is only advocated in standard first aid!·
wounds of the scalp which are complicated by the presence of a fracture or a fo·
body. After covering the wound with a light dressing, e.g. gauze, the ring p·
should be applied so that the wound is within the centre of the ring and t·
padding takes up pressure all around. The ring pad is finally secured by a br·
or narrow bandage applied firmly round the head.

It is not generally appreciated that a ring pad can be employed for other p·
of the body when use of a pad and bandage is contraindicated by a foreign b·.
In this event, the ring pad should be applied as described and secured by a ban·
tied firmly on to a splint on the opposite surface of the limb.

Pressure points.—A pressure point is valuable as an immediate measure bec·
it can be quickly applied and leaves the first-aider free to examine the wo·:
thoroughly, or even to undertake treatment while the bleeding remains un·
control. A common fault is use of the wrong pressure point; the one chosen sh·
be that which is the nearest available to the wound. Moreover, the thumb sh·.
be used, whenever possible, since it is the strongest digit.

Prolonged use of a pressure point, using relays of assistants, is undesir·:
since it is liable to cause harmful effects similar to those produced by a tourniqu·.

Tourniquets.—The too frequent use of the tourniquet has been sufficiently
condemned during the war. It should be employed only when direct pressure is
unsuccessful or is contraindicated. Nevertheless, it must still be considered a
most valuable instrument, provided it is applied efficiently.

Errors arise through faulty application and through not observing the precautions
which have so often been emphasized in connexion with its use. So far as applica-
tion is concerned, it should be noted that the standard first-aid tourniquet, i.e.,
that provided with a pad, can only be applied to the brachial, and to the upper
third of the femoral, arteries. An improvised tourniquet, made by tying two
knots near the middle of a narrow bandage can, however, be used for the arteries
of the wrist and ankle. The usual fault in applying a tourniquet is failure to
adjust the pad accurately to the surface marking of the blood vessel or, having
done so, omitting to notice that it has slipped during transport of the patient.
Many rules have been laid down to govern the use of the tourniquet. Those
which are most frequently broken are as follows:—(1) The twister must be
adjusted so that the pressure is *only just* sufficient to stop the bleeding. (2) Every
quarter of an hour the instrument must be loosened to allow the blood to circulate
through the limb and to see if the bleeding remains under control. If it is necessary
to re-tighten, the pad should be moved downwards towards the wound before
readjustment. This gives the tissues at the seat of application a chance of recovery
from the damaging effects of pressure. (3) Whenever possible, the tourniquet
should be applied over a layer of flannel, or the clothing, to prevent 'biting.'

Flexion and other methods.—Flexion is a method of stopping the popliteal, and
the brachial artery at the elbow. It consists of applying a pad into the flexure and
forcibly flexing the joint, securing it in this position by a figure-of-eight bandage
round the thigh and leg, or the arm and forearm respectively. The method is far
from satisfactory and is only rarely employed. For arresting the axillary artery
a somewhat similar method is adopted. It consists of placing a small round
pad high up in the armpit and securing it by a figure-of-eight bandage around
the shoulder and opposite axilla. Finally the affected arm is firmly adducted
by means of a broad bandage applied from the lower part of the arm, round
the body and tied on the opposite side, the forearm being flexed to a right angle.
This method often fails because too large a pad is used and is not forced sufficiently
high up in the axilla. Moreover, the bandages are not tied sufficiently firmly,
especially that which passes round the body. In any case, its effects are similar
to those of a tourniquet.

THE FUTURE

It will be seen from the foregoing that first aid is in fact a simple subject, but it is
a grave mistake to assume that it can be practised or taught efficiently without
making it into a "special study" like the other branches of medicine and surgery,
e.g., skin, ear, nose and throat, and eyes, which are so consistently neglected by
the average medical student. With the advent of peace the public will rightly
expect an ambulance organization comparable in efficiency to that attained in
war time. This may involve complete reorganization—stationing accident ambu-
lances at hospitals and sending them to an incident, not only with a stretcher
party of trained first-aiders but also with a casualty house surgeon in attendance.
And already there is talk of a National Ambulance Service.

Immediately before the outbreak of war, 900 beds for prolonged institutional treatment were provided in special units, 650 beds being reserved for active acute and subacute cases and 250 beds for doubtful and convalescent cases. Usually 800 to 850 of these beds were constantly in occupation. Supervision was provided for by the establishment of twenty Rheumatism Supervisory Centres and, in addition, many children were supervised at the out-patient departments of voluntary hospitals and by practitioners working in the school medical service. Avoidance of duplicated supervision was ensured by central control.

THE RHEUMATISM SUPERVISORY CENTRE

The importance of the part played by the supervisory centres in the London County Council's Rheumatism Scheme justifies a detailed description of these units. Their functions may be conveniently summarized as being (1) supervisory; (2) diagnostic; (3) educational; and (4) social. It will be noted that treatment is not mentioned; the out-patient clinic has no place in the treatment of juvenile rheumatism, and when the organization of the centres was under consideration this was recognized as one of the essential principles to be observed. Another and equally important principle was that the physicians in charge of the centres should be highly qualified and of consultant rank. It was also recognized that the number of cases seen at a session must be strictly limited; for the system to be of any value the physician must be able to devote a considerable amount of time to each case. if the numbers are such that the session resolves itself into a mere "procession" of parents and children the money spent on the centre is money wasted. The personality of the physician in charge is of the utmost importance. It should hardly need to be emphasized that he or she should be interested in, and have had experience of, juvenile rheumatism; but, further than this, much tact and care are needed to avoid friction with private practitioners, hospitals and school authorities. It has been laid down as a strict rule that no child already under supervision by a private practitioner or at a hospital shall be accepted for supervision at a London County Council Centre, and that all recommendations as to modifications of school curriculum shall be passed *directly* to the school authorities and school medical service and not *via* the child's parents. Only thus can constant friction be avoided and differences of opinion, when they arise, be settled by amicable consultation. It is a great advantage if the physician in charge of a centre has knowledge of school conditions and the workings of the school medical service.

EQUIPMENT OF CENTRES.—If, as in the case of certain of the L.C.C. centres, the centre is organized in connexion with the out-patient department of a hospital no special equipment will be needed. For independent centres the main desiderata are (1) an examination room and suitable waiting room *adequately heated;* (2) an examination couch; (3) apparatus or facilities for hæmoglobin estimations, blood counts and sedimentation rates, the last named being essential; (4) urine testing apparatus; (5) sphygmomanometer; and (6) suitable record cards.

THE WORK OF THE CENTRES.—(1) *Supervisory.*—The object of this section of the work is to keep under periodical supervision children known to have suffered from an attack of rheumatic infection; the children discharged from the rheumatism units form the bulk of these cases. The supervision ensures that signs of the

reactivation of the disease are quickly detected and the necessary measures taken to ensure further treatment.

(2) *Diagnostic.*—Children showing signs suggestive of rheumatic infection are referred to the centres for diagnosis. Parents, teachers, school doctors and private practitioners are encouraged to take advantage of the specialist advice obtainable at the centres.

(3) *Educational.*—Much ignorance still prevails outside the medical profession regarding the signs, symptoms and dangers of rheumatic infection in children. Not the least important function of a supervisory centre is the dissemination of knowledge on these points and the advising of parents, teachers and others concerned in matters of rest, physical exercises, and the school curriculum.

(4) *Social.*—An essential member of the staff of a rheumatism supervisory centre is a skilled social worker. At the London centres the social worker is a member of the School Care Organization. This care worker is present in the medical examination room for the purpose of informing the physician of any relevant facts concerning the child's environment or making inquiries regarding it if the physician so desires. Reports of insanitary or dilapidated premises are brought to the notice of the Medical Officer of Health and recommendations for preferential consideration in regard to rehousing are sent to the appropriate quarter. In addition, it is the business of the social worker to keep in the closest contact with the family and to make every effort to ensure that the physician's directions and advice are carried out.

INSTITUTIONAL TREATMENT

In normal times, about 2,000 applications reach the Rheumatism Section each year. In each case the child is examined by a physician of consultant rank, who makes a detailed report which is used by the supervising medical officer as a guide to determine if the case is a suitable one for the scheme, and, if so, the type of unit to which it should be allocated. This procedure is a most necessary one. The scheme is essentially concerned in the prevention of the development of cardiac cripples and it has always been regarded that, on the one hand, the diagnosis of rheumatic infection should be reasonably certain, and, on the other hand, that the beds should not become blocked with cases in which the heart is hopelessly damaged and in a chronic state of failure. Usually about 200 applications have to be rejected for one or other of these reasons each year.

ANALYSIS OF CASE HISTORIES

In addition to the above administrative reason for the procedure, the detailed histories, which are difficult to obtain otherwise than by special reports, when tabulated, supply much interesting information in connexion with the etiology of juvenile rheumatism. It has already been pointed out that there is a great deal of evidence in support of the presumption that the disease is due (or at any rate associated with) a streptococcal infection. Analysis of the large numbers of detailed case histories which are available each year furnishes suggestive facts in connexion with subsidiary or predisposing factors. In the limits of a short article it is impossible to do more than summarize them under their appropriate headings:—

Supervisory Centres gave a somewhat similar picture of the relative incidence of the different types:—

Children with a history of acute polyarthritis	.. .. ..	17 per cent.
Children with a history of subacute rheumatism	.. .. ..	53 per cent.
Children with evidence of carditis but no definite rheumatic history		19·5 per cent
Children with a history of chorea	.. ..	10·5 per cent

Figures obtained from the units and the supervisory centres show a constant relative sex incidence, the ratio of the number of boys affected to the number of girls being almost exactly 3 : 4.

Acute rheumatic carditis without any joint manifestations rarely occurs as an initial sign of rheumatic infection but is by far the commonest and most dangerous form of relapse after apparent recovery from the initial attack. In children who have been nursed at home, it is exceedingly likely to pass unnoticed for days or even weeks, and during this period irreparable cardiac damage may occur. Relapses in children under treatment in the units have been found to occur in approximately 15 per cent. of all cases in which the initial attack was an acute arthritis and, except in a negligible percentage of instances, the relapse took the form of an acute carditis. In some instances the relapse is heralded by the child complaining of a slight "sore throat," and on examination the fauces are found to be somewhat reddened. In other instances a frank tonsillitis warns the clinician of the possibility of danger ahead, but in the great majority of the cases there are no warning symptoms. The onset of these relapses is frequently about ten weeks after the disappearance of the initial signs of acute infection, and, in children who suffer from recurring relapses, the periods of quiescence between the relapses are also usually about ten weeks, with a tendency to shorten in the worst type of case. Only if a child is under constant supervision under hospital conditions can these relapses be detected in sufficient time to minimize their dangers.

Clinically, a sudden softening of the first sound at the apex or a softening and prolongation of an already present apical murmur warns the physician that further trouble is brewing, but detection of these changes at the earliest possible moment necessarily implies that he has a very clear "sound" picture of the particular patient. It is not the fact that a sound or murmur is "soft," but the fact that a change in that direction has become evident. No one examining such a heart for the first time could possibly give any useful opinion as to the presence or absence of carditis.

Next in importance to the change in the cardiac sounds is the development of a tachycardia. Here, again, the sign is a relative one and must be interpreted in the light of the practitioner's knowledge of the particular patient; and a knowledge of the sleeping pulse rate is almost essential in evaluating the importance of the tachycardia.

But the most important information of all is that furnished by the erythrocyte sedimentation rate In my opinion it is not putting the matter too strongly to say that no case of juvenile rheumatism can be regarded as being properly supervised if periodical readings of the sedimentation rate are not obtained. Fortnightly estimations, at least, are desirable, but a weekly estimation is the ideal to be aimed at. With the capillary tube technique there is no objection to this being done

even with the most nervous child, and the method is quite as satisfactory for diagnostic purposes as the venepuncture method. A sedimentation rate greater than 15 mm. in one hour is, in the absence of any other obvious cause, almost invariably an indication of active carditis in a known rheumatic child, and it is generally the earliest of all indications. For junior practitioners this test is most valuable, and if at times a certain lack of discrimination is noticeable in its interpretation, it is at least a mistake on the right side. For several years it has been employed in the Council's rheumatism units as a diagnostic check, and there is no doubt at all that its timely warning has often been the means of averting the development of permanent cardiac damage. In a few of the cases of severely acute carditis the temperature may be irregular, but in the majority of instances of relapsing carditis it remains normal.

Acute rheumatic pericarditis, like carditis, is hardly ever an *initial* manifestation of rheumatic infection. Unlike carditis, it is not likely to remain unrecognized for more than a day or two. The temperature is invariably raised and irregular and usually the child complains of discomfort or even præcordial pain. In the rheumatism units its expected incidence in children, when the initial attack was a polyarthritis, is approximately 1 to 2 per cent. Large pericardial effusions have rarely been encountered.

Subacute rheumatism is still somewhat of a bugbear to both the diagnostician and the administrator. Most of the medical practitioners working in Rheumatism Supervisory Centres have arrived at conclusions similar to those of Dr. T. W. Preston, who long had charge of two of the Council's largest clinics. Dr. Preston was of the opinion that:—

(1) A long history of aching limbs in a child whose mother states that it has had rheumatism "all its life" can in general be ignored; such children rarely develop anything objective.

(2) The true case of subacute rheumatism usually has a history of a mild febrile illness, and sometimes a history of the sudden development of a stiff joint or "sprain" which lasted a few days. Such episodes have recurred at irregular intervals, and such are the cases in which not infrequently an "insidious" carditis ambles gently along to its goal of permanent valvular damage.

Experience as the supervising medical officer of the Council's Rheumatism Scheme, involving as it has done the reading of many thousands of case records, has convinced me of the soundness of Dr. Preston's conclusions, and for several years I have adopted his criteria in deciding the disposal of "subacute" cases.

Cardiac involvement is almost certainly present in all cases of juvenile rheumatism, except the very mildest. In a certain proportion of cases it assumes an almost fulminating character from the initial onset of the disease, and causes immediate and irreparable structural damage. In a second group of cases the clinical signs of permanent valvular damage develop between the second and third weeks of the disease, and in a third group of cases the carditis gradually subsides, leaving the heart apparently without any permanent damage. The more efficient the treatment the more likely will it be that the number in the second group will diminish, with a corresponding increase in the number found in the third group. The incidence

NOTES AND·QUERIES

FLUOROSCOPY IN GENERAL PRACTICE

QUESTIONS (from a practitioner in Ireland).—
(1) What is the full technique in the use of the vertical fluoroscope in the consulting room? (2) What is its efficiency as an aid to diagnosis? (3) What are the dangers of fluoroscopy? (4) Does the fluoroscope come within the limit of the general practitioner for use in the consulting-room, and would you advise the use of same in general practice? (5) How does fluoroscopy compare with radiography as an aid to diagnosis? (6) What are the standard models and what is the approximate cost of same?

REPLY.—(1) A fluoroscopic screen is an essential part of the equipment of any standard X-ray unit, and is used for the study, on the screen, of moving parts, as in gastro-intestinal and chest work. The current used is 3 m.a. at about 75 k.v. The inquirer may have in mind a fluoroscopic box in conjunction with a portable apparatus; if so, this is quite useless for gastro-intestinal work, and in chest work would only reveal gross pathology. (2) The efficiency of fluoroscopy in diagnosis is directly proportional to the experience and skill of the fluoroscopist. The haphazard use of fluoroscopy in the consulting room, in the hope that "something will turn up," is a bad diagnostic procedure. (3) The dangers are negligible in the modern unit, but with a portable, unprotected fluoroscope, harmful overdosage could be readily possible to the operator. (4) No, unless special training has been undertaken, and adequate hospital experience obtained. (5) Fluoroscopy and radiography are complementary one to the other; greater detail is obtained with a radiograph. (6) Many excellent portable units are available for the Forces and hospitals, but at present a licence is required for the purchase of all new apparatus. The firm of Solus has put on the market lately a small portable screening stand designed for the control of artificial pneumothorax in tuberculosis clinics. The price of this model is £150.

D MUIR SCRIMGEOUR, M.D., D.M.R.E.

PRURITUS ANI OF MYCOTIC ORIGIN

CAPT. D. H. WATERWORTH, M.B., B.S., A.A.M.C., writes from Tasmania:—"There appears too great a readiness to diagnose 'idiopathic' pruritus ani merely because there is no obvious associated local pathology. Of six cases seen in the past three years, in one only was there no discoverable cause. There is little doubt that the remaining five were due to infection of the perianal skin with a pathogenic fungus. The series may have been exceptional, yet the cases had the typical textbook features of the disease. In only two cases were scrapings taken. The fungus was discovered in each, but the species was not identified: it was possibly monilia in the majority. This parasite not uncommonly invades the perianal and crural region. The first patient was a man of thirty with severe pruritus of eight years' duration; two consultant dermatologists had considered the pruritus to be of neurotic origin. The patient had had numerous local applications, X-rays, and 'A.B.A.' injections, with negligible relief. On examination the perianal skin was seen to be reddened, with a sodden, whitened, superficial layer and a reddened edge, in places undermined. The dermatitis was limited to areas where skin surfaces were in constant contact —the natal cleft, the crura, the inner and upper surfaces of the thighs, and both sides of the scrotum. Small outlying vesicles were present on the skin of the thighs, but not elsewhere. Numerous fissures were present and hypertrophied folds of skin radiated from the anus. There were the usual excoriations and a slight slimy exudate with an offensive odour. Culture and microscopic examination revealed fungus and secondary infection with Strep. faecalis. The condition was cured in a few weeks. The other cases presented similar features, except that the infection was limited to the skin immediately surrounding the anus for an inch or so. The degree of maceration was variable. Itch was severe. Diagnosis of this type of case may be made tentatively on clinical appearances, but if possible the fungus should be searched for in scrapings. Treatment, if dermatitis is severe, should begin with mild antiseptic and astringent applications. One per cent. aqueous gentian violet is excellent, applied daily for four or five days. When the skin will tolerate it, Whitfield's ointment well rubbed in daily, or mycozol, will complete the cure. Mild cases will tolerate salicylic acid from the onset. Over-treatment should be avoided.

TREATMENT OF MALARIAL SPLENOMEGALY

QUESTION (from a subscriber in Arabia).—Is there any treatment for enlarged malarial spleens? Quinine does not reduce them.

REPLY.—Quinacrine or mepacrine tablets 1 t.d.s., p.c. for a week following five days of quinine, should reduce any spleen of which the enlargement is due solely to malaria.

A. L. GREGG, M.D., M.C.S.

PRACTICAL NOTES

PROLACTIN IN THE CONTROL OF MENORRHAGIA

On the basis of the investigations of Greenblatt, who showed that the blood of lactating women was useful in the treatment of metropathic menorrhagia, lactogenic hormone was administered for varying periods of time to forty-three women with organic or functional uterine bleeding (H. S. Kupperman, P. Fried, and L. Q. Muir: *American Journal of Obstetrics and Gynæcology*, August 1944, 48, 228). Two preparations were used, the most effective being a sterile powder with saline as solvent, in dosage of 100 to 250 I.U. per injection, given subcutaneously every day or second day during the period of abnormal bleeding. In some long-standing cases doses of 100 to 200 I.U. of prolactin daily for four to eight days were found necessary. When possible, suction curettage was carried out to determine the condition of the endometrium before and during the administration of prolactin. In a group of seventeen women suffering from functional menorrhagia only two failed to respond to the hormone therapy. Daily injections of 100 I.U. were given during the period of uterine bleeding, resulting in cessation of bleeding in fifteen cases. In subsequent cycles, if prolactin was injected on the first day of the menses and continued for two to three days, the bleeding was controlled. Seven patients in this group did not receive further injections after the first successful course: five had normal subsequent cycles and in two the condition of excessive and prolonged uterine bleeding recurred. There was good response in patients with menorrhagia associated with uterine fibromyomas, although higher dosage was necessary—daily doses of 100 to 200 I.U. for a period of four to eight days—whereas in functional menorrhagia the daily administration of 100 I.U. for three to six days was sufficient. It is stated that the prolactin was not administered to the patients with fibromyomas of the uterus for the purpose of causing a regression of the growth, but was merely employed to get the patient into a proper physical condition to undergo operation. Suppression of the bleeding was also obtained in cases of cystic ovaries and chronic pelvic inflammatory disease, and when dysmenorrhœa was associated with excessive bleeding some mitigation was obtained. Signs and symptoms of threatened abortion were also alleviated by the administration of prolactin in three out of six patients with a history of previous abortions.

ENEMAS

As a result of his observations upon 15,000 patients over a period of twenty-five years, E. S. Hicks (*Canadian Medical Association Journal*, October 1944, 51, 358) is of opinion that soapsuds enemas should not be used and that large enemas often do more harm than good. In a large series of patients who had been operated upon and who had been given soapsuds enemas (often large ones) he found many who had difficulty in restoring normal bowel function after their discharge from hospital, and in a number of these, on whom proctoscopy was performed, proctitis could be demonstrated. He therefore advocates the use of 3 to 4 oz. enemas, starting with 50 per cent. molasses in water, the percentage of molasses being rapidly reduced to 25 per cent. and 10 per cent. To the "average surgical abdominal case" with a hospital stay of fourteen days, he gives a small daily enema from the third to the tenth day; from the tenth day until the patient leaves hospital he gives a daily enema, if necessary, combined with whatever laxative the patient takes at home. Molasses was chosen as the basis of the enema for the following reasons: (1) it is relatively non-irritant; (2) it is easily available; (3) it is cheaper than glycerin; (4) it is easily miscible in varying strengths; (5) it is not incompatible with any additional medicament, such as turpentine; (6) it is effective. An analysis of records showed that only 6 per cent. of patients given small enemas gave a history of rectal irritation or of faintness at the time the enema was given, compared with 33 per cent. of those given soapsuds enemas. A further point emphasized by the author is the uselessness of giving enemas of any kind in abdominal surgical cases until the patient has voluntarily passed flatus.

THE USE OF SODIUM BICARBONATE WITH SODIUM SALICYLATE IN RHEUMATIC FEVER

In view of recent evidence that a high salicylate level in the blood is essential for the effective treatment of rheumatic fever, considerable importance attaches to the findings of Katharine Smull, R. Wégria, and Jessica Leland (*Journal of the American Medical Association*, August 26, 1944, 125, 1173), who found that the simultaneous administration of sodium bicarbonate and sodium salicylate prevented the establishment of as high a serum salicylate level as could be attained with sodium salicylate alone. Four adult patients with acute rheumatic fever and

REVIEWS OF BOOKS

Social Aspects of Tuberculosis. By S. ROOD-
   HOUSE GLOYNE, M.D., D.P.H. London:
   Faber & Faber Ltd., 1944. Pp. 148.
   Price 8s. 6d.

THIS excellent handbook, written as the out-
come of lectures to health visitor students,
appears at an appropriate time, when the intro-
duction of mass radiography is at last making
the public conscious of the huge national
wastage caused by the "Captain of the Men of
Death." It not only sets out in orderly fashion
every social aspect of the disease; it makes
romantic reading of the masses of material
so often lost in bald tables to all but epidemi-
ologists and statisticians. It could have been
written only by an author who has inwardly
digested a wide reading in social history. The
chapters on "Soils for Tuberculosis," "Infec-
tion and the Portals of Entry," "Tuberculosis in
Non-immunized Races," and "Tuberculosis in
Industry," are masterly essays. Their sim-
plicity of statement is the mark of the true
expert. It would be good to see, and see
repeated, in large print in the public press
some of the author's observations and deduc-
tions:—"The time allotted for institutional
treatment in this country is far too short";
"No scheme for the prevention of disease will
repay the State for the outlay without adequate
after-care"; " The existence of a waiting list of
more than a few days should be anathema to any
well-organized scheme." Two constructive
suggestions might be made. First, the dangers
of close nursing by a relative during domiciliary
treatment could be mentioned. Secondly, more
differentiation might be drawn between the
precise meaning of rehabilitation and life in
village settlements, for these are not the same
thing : temperamental suitability is a prime
factor in the choosing of a settler. The limitation
in numbers which it imposes precludes the
possibility of a properly run settlement becom-
ing top-heavy, whilst the final criterion for its
success must be its ability to compete in the
open market with products paid for at full
trades union rates of wages. This book deserves
a wide publication. It should be in the hands
of every health visitor, every almoner and every
sanatorium medical officer and nurse.

*Old Age: Some Practical Points in
   Geriatrics.* By TREVOR H. HOWELL,
   M.R.C.P.ED. London: H. K. Lewis & Co.
   Ltd., 1944. Pp. 50. Price 4s. 6d.

GERIATRICS is much to the fore these days and

in this little book the Deputy Ph
Surgeon at the Royal Hospital, Chel
on record his views on various aspec
as seen among the famous Chelsea
Several of the chapters have alread
lished in different journals, incl
Practitioner. The subjects dealt with
problem of hypertension in the ag
bronchitis, cardiovascular diseases,
cerebral ischæmia, rheumatic disease
nosis. Apart from the writings of
Humphry Rolleston, the problem o
one that has received little attent
country, and it is most appropriate
undoubtedly but one of the first of
publications on the subject should
the "Chelsea Hospital." Captain I
be congratulated on his initiative in
the results of his investigations
carrying on the precedent set by
cessors in office. Based upon pract
ence the book contains much soun
a subject of increasing importance.

The Sick African: A Clinical
   MICHAEL GELFAND, M.B., CH.
   With a foreword by Col. A. F
   Cape Town: Post Graduate
   Stewart Printing Co. (Pty.)
   Pp. 373. Figures 123. Pr

THE author of this book, with exten
ence in the Government Medical
Southern Rhodesia, also holding I
laboratory appointments, is just t
write on something the value of
depend upon clinical experience. In
his experience is simply, yet forceful
so that satisfying statements rather
theorizing award the reader. The
"The Patient" and "Nutritional Di
most informative, especially for
accustomed to primitive conditions.
each is devoted to the commoner dis
are fully discussed, especially bilharz
chapters are devoted to disease a
various organs or systems and, final
Acute Abdomen," "Malignant Dise:
orders of Infancy and Childhood,'
of the Skin" and "Intestinal Parasite
the amount of information convey
ishing. The exposition is clear and
tions in the form of photographs nu
striking. If fault must be found
might be taken to the inadequate

ientery; to the absence of mention of concention of ova for stool examinations; to vague-'n stating the dilution of the antimony in mentioned on p. 78, and to the absence :cautionary instructions to the attendants :tims of plague. A total dosage of 25 to ains of sodium antimony tartrate would inadequate to cure kala-azar. Finally, .r consistency in italicizing scientific names, ; capitals to the genus and denying such : species, would be desirable, and occa- errors connected with pronouns and .uation bother the reader. Such criticisms, ver, need not detract from the value of a book.

[anual of Ophthalmology for Medical fficers. By Lt. Col. RYECROFT, M.D., D.M.S., F.R.C.S., R.A.M.C. London: amish Hamilton Medical Books, 1944.). viii and 95. Figures 59. Price is. 6d.

teaching of ophthalmology to under-uate students is somewhat of a puzzle. graduates will take up courses of ophthalm-y at their own free will because they are :ested, or are both interested and wish ractise ophthalmology. But what degree of wledge of eye diseases is necessary for the age medical student and later practitioner lebatable. The difficulty is to give enough yet not too much. Colonel Ryecroft has, the whole, successfully achieved the via ia. There is nothing new in this book but, ar, the war has not produced any ophthalmic elties. The chapter on "Treatment" is :icularly deserving of note, although the final ion on "Technical Procedure in Military ctice" is rather beyond the scope of the i-specialist. The chapter on "Diseases of the :" is in places redundant, but is so clearly ressed without undue elaboration that it rely emphasizes the previous chapter on tment. The book is a most convenient size, too small, just fitting into the side pocket of reatcoat. It will be of great value, not only Service officers but to the general practitioner.

ttle for Health. By STEPHEN TAYLOR, M.D., M.P.C.P. London: Nicholson & Watson, 1944. Pp. 128. With 13 :oloured charts and 91 photographs. Price 5s.

is book is issued in a series called "The New mocracy" and has as its subtitle "A Primer Social Medicine." It is, literally, a graphic ount of the battlefield, the casualties, the mies, the soldiers and the weapons in the

fight against disease. The illustrations are well chosen, including a series of pictorial charts in colour, designed by the Isotype Institute, and Dr. Taylor's commentary is clear and convincing. Although many aspects of the subject are far from attractive the book never ceases to be, and from it the intelligent layman should easily learn how he may cooperate in the campaign for better health. Practitioners also will find much here of strategical value.

A Handbook for the Student Health Visitor. By EDITH WILD, S.R.N., S.C.M., R.S.I. With a foreword by F. T. H. WOOD, O.B.E., M.D., B.S., B.Sc., D.P.H. London: H. K. Lewis & Co. Ltd., 1944. Pp. vi and 66. Price 3s.

THIS is an excellent little book, written with wit and a broad humanity. Not only health visitors but those who control them or rely on their work should study it for its broad common sense and general usefulness.

NEW EDITIONS

WAR-TIME difficulties and restrictions have delayed the appearance of the third edition of The Hair and Scalp, by AGNES SAVILL, M.D., F.R.C.P.I. (Edward Arnold & Co., 16s.), but, as gleaned from the author's preface, the delay has resulted in the inclusion of a number of advances which would otherwise have been withheld until a later date. In such category is the use of penicillin in the treatment of impetigo contagiosa. The new edition, which is well illustrated, deals in a practical manner with the diagnosis and treatment of all conditions affecting the hair and scalp, and some useful formulæ are included.

A NUMBER of new illustrations have been added to A Pathology of the Eye, by EUGENE WOLFF, M.B., B.S., F.R.C.S., in its second edition (H. K. Lewis & Co. Ltd., 42s.) and considerable rewriting has been undertaken in its preparation, with the object of stressing the morbid histological aspects. The new edition is beautifully produced and shows little evidence of war-time restrictions.

ALTHOUGH the text of the fourth edition of Rheumatism: A Plan for National Action, by LORD HORDER, G.C.V.O., M.D., F.R.C.P. (H. K. Lewis & Co. Ltd., 2s.) has been little changed, new information will be found in the author's preface, in which it is stressed that the preservation of the health of every citizen is a matter of "supreme defence interest," and thus is a direct contribution to the war effort. The sections on the causes of rheumatism and methods of treatment are of vital interest to all practitioners.

NOTES AND PREPARATIONS

NEW PREPARATION

TYROTHRICIN—Derived from autolysed cultures of *B. Brevis*, tyrothricin is an antibacterial substance with a selective action against gram-positive organisms. It is both alcohol- and water-soluble, and contains from 10 to 20 per cent. gramicidin and from 40 to 60 per cent. tyrocidine. Administered locally or by instillation, tyrothricin is stated to be effective in the treatment of eye infections, sinuses, indolent ulcers and infected post-operative wounds. The product is supplied by the Mulford Biological Laboratories of Sharp and Dohme, Brocket Road, Hoddesdon, Herts, in two dosage forms: a 1 c.cm. ampoule containing 25 mgm. tyrothricin, accompanied by a vial containing 49 c.cm. sterile, distilled water for dilution; and in a vial containing 20 c.cm. of tyrothricin concentrate (25 mgm. tyrothricin per c.cm.) to be diluted to 1000 c.cm. with sterile, distilled water. The manufacturers have published a booklet which gives the history of the discovery of tyrothricin, records of its clinical use, and methods of dilution, dosage and administration, a copy of which is available on application.

MEDICAL SCIENCE AND PHYSICAL EDUCATION

THIS is the title of an interim Report by the Research Board for the Correlation of Medical Science and Physical Education. Chapter 1 is devoted to Maternity and Child Welfare, and contains sections on ante- and post-natal exercises and the effect of gymnastic training on fertility and the capacity for child-bearing. Chapter II, on Education and Recreation, includes information on the training of teachers and facilities available. Chapter III is devoted to the Services, and chapter IV to Industry. The value of physical therapy in rehabilitation of the sick, injured and disabled is obvious from the records in the section devoted to this subject. The Report is published by the Research Board for the Correlation of Medical Science and Physical Education and the Ling Physical Education Association, Hamilton House, Bidborough Street, London, W.C.1, price 2s.

THE JAMES MACKENZIE INSTITUTE FOR CLINICAL RESEARCH

THE twenty-fifth Annual Report of the James Mackenzie Institute, issued in December 1944, contains the pleasing statement "the Council are pleased to state that in spite of war influences records show that the general health of the child population is being maintained at a satisfactory level." It is also encouraging to note that for the year exceeded expenditure, a fact w... is testimony to the appreciation of the re... research work being carried out at the I..., which was founded by the late Sir J. Mackenzie in 1919. Donations should to the Secretary, The James Mackenzie tute, St. Andrews, Fife.

OFFICIAL NOTICES

QUINIDINE—A note has been issued by Ministry of Health emphasizing the ... for the strictest economy in the use of quini... the supply position of which at the p... is extremely difficult. Practitioners are ask... cooperate by prescribing the drug only ... there is need to restore the normal rhyth... the heart in auricular fibrillation, aur... flutter and paroxysmal tachycardia, and ... only in dosage restricted to the minimum ... sary for control of the case. *The Treatme... Wound Shock* (Med. Res. Coun. War M... No. 1). The second edition of this memor... has just been issued and, in addition to ... tion on the different types of wound sh... their treatment, contains useful sections o... subject of blood transfusion. *Arterial Inj... Early Diagnosis and Treatment* (Med. ... Coun. War Mem. No. 13), by the V... Injuries Sub-Committee of the M.R.C. ... Wounds Committee, deals with the ... anatomy, the clinical manifestations and ... treatment of arterial injuries. Four ... are added, devoted respectively to the tech... of arterial suture, the administration of hep... sympathetic nerve block, and the metho... writing up case notes in vascular injuries. T... memoranda are obtainable from H.M. ... ery Office, price 6d. and 4d. respectively.

FUNCTIONS OF THE PITUITARY GLAND (ANTERIOR LOBE)

By F. G. YOUNG, D.Sc., Ph.D.

Professor of Biochemistry, University of London.

)URING the past two decades striking progress has been made towards the
:cidation of the physiological function of the anterior lobe of the pituitary gland
l, although there is still much to be learned, the broad outlines of the picture are
'oming apparent. Unfortunately, the experimental advances have not been
.alleled by rapid progress in therapeutic application, and the results of attempts
·utilize clinically the methods developed as the result of experimental research
7e been on the whole disappointing.

3ince the comparatively scanty therapeutic advances have recently been noted
this journal (Sharpey-Schafer, 1944), the present article will be devoted to a
asideration of experimental investigations, and an attempt will be made to
'licate the general ideas now in the process of development regarding the
,actions of this interesting gland. If this discussion fails to do more than indicate
.a complexity of the problem, it will at least have the merit of providing a reasoned
'ckground for the disappointment from which the clinician may have suffered
;the paucity of results of clinical value that have yet emerged from a large volume
c experimental research.

'The experimental results to be discussed have been largely derived from investi-
.tions on the rat, rabbit, cat and dog, and, since these species differ substantially
;their behaviour, in some respects, when treated with anterior pituitary extract,
·is clear that the direct application to man of all the results to be discussed may
;t be justified. Furthermore, when it is realized that the nature of the experi-
-ental results may be influenced not only by the species of animals but by the age,
d by the nature and quantity of the diet consumed by the individuals of a given
ecies, it is clear that great caution is essential in the transference of results
)tained with one species to another whose dietary habits may be significantly
·fferent. Nevertheless, progress is being made, albeit slowly, in the application
man of the results of experiments with animals, and it is hoped that the wider
,fe realization of the significance and limitations of the methods developed in
lation to animal experiments, the more rapidly will accrue the successful thera-
'·utic application to man of the results already obtained.
,\

,HYSIOLOGICAL EFFECTS OF THE REMOVAL OF THE PITUITARY GLAND

' is now generally accepted that life is compatible with extirpation of the pituitary
,and (anterior plus posterior lobes), despite the profound endocrinological and

metabolic disturbances which follow its removal. Under favourable condit[i]
hypophysectomized rat may survive for about one-half of the total li[f]
control animals. But the pituitary gland lies deep in protective tissues "T [s]
nugget in the innermost of a series of Chinese boxes" (Cushing), and it [b]
surprising that a proportion of the early investigators did cause death [in]
successful attempts to remove the pituitary gland, whilst others observ[e] [c]
development of a remarkable obesity in surviving animals.

Clear-cut results were first obtained as the result of the evolution of [n]
methods for the removal of the pituitary gland in the rat, a development larg[ely]
to the painstaking research of P. E. Smith (1927, 1930). Smith was able to [d]
strate clearly what had been suspected by some of the earlier experimental in[v]
gators, namely, that removal of the pituitary gland does not cause death, and
not induce obesity unless hypothalamic tissues are damaged in the oper[a]
The possibility that involvement of the brain in pituitary disorders m[i]
responsible for the development of adiposity, rather than damage to the [g]
itself, had been envisaged by Bramwell on clinical grounds as long ago as [1]
but it was the experimental work of Smith with the rat that not only first made[r]
the far-reaching endocrinological changes which result from ablation of
pituitary gland, but also showed unequivocally that simple hypophysectom[y]
not produce obesity, in the rat at least.

According to present knowledge the outstanding *morphological effects*, in
mammal, of total removal* of the pituitary gland are (a) cessation of grow[th]
the body and skeleton in the young animal, with cachexia of varying [de]
the adult; (b) atrophy of the thyroid gland, adrenal cortex and reproductive [o]
(c) no change (or possibly slight hyperplasia) in the parathyroid glands,
medulla, and islets of Langerhans of the pancreas; (d) hypotrophy of the ab[d]
viscera, in particular of the liver, spleen and kidneys. These morphological [eff]
are accompanied by alterations in metabolic functions, of which the following
the chief:—

(1) Fall in basal metabolic rate.

(2) Diminution in appetite.

(3) Tendency for the development of hypoglycæmia, which may be fatal, du[ring]
    a short period of starvation. During starvation the glycogen stores
    rapidly depleted, whilst endogenous protein metabolism is reduced;
    respiratory quotient during fasting is abnormally high.

(4) In comparison with intact animals receiving the same amount of food [the]
    hypophysectomized animal stores less carbohydrate (Russell, 1938) [and]
    protein, and more fat (Lee and Ayres, 1936). But it should be emphasi[sed]
    that, in comparison with an intact animal receiving food *ad libitum*, [the]
    animal lacking a pituitary gland stores less fat, as well as less protein [and]
    carbohydrate, because of his poor appetite; nevertheless, if the hyp[o]
    physectomized rat is forcibly fed an amount of food equal to that consum[ed]

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* The term "total removal" is an arbitrary one, since varying proportions of the s[talk]
and of the pars tuberalis may be left. But in this and other matters general approximat[ions]
only, rather than detailed discussions, can be given in the present review.

voluntarily by an intact control animal, an excessive amount of fat is
deposited (Levin, 1944).

Increase in sensitivity to the hypoglycæmic action of administered insulin.

Diminution in the intensity of the diabetic condition produced by removal
of the pancreas (Houssay).

Cessation of sexual activity; abortion in pregnant animals, and cessation of
milk production in lactating mothers.

...ere is reason to believe that these changes are associated with removal of the
...ior lobe and not of the posterior part of the gland, since in amphibia, in which
...wo portions of the organ are easily removed separately, analogous changes
...r removal of the pars glandularis, but not after extirpation of the pars neuralis.
...me mammals it is known that removal of the posterior lobe of the pituitary
...l does not influence pregnancy, parturition and lactation, and does not alter
...in sensitivity, although it produces a sustained diuresis (experimental diabetes
...idus), a phenomenon not observed when both lobes of the pituitary gland are
...ed. Conversely, removal of the anterior lobe alone from the rat results in an
...ase in sensitivity to the hypoglycæmic action of insulin, which is similar to
...observed after complete hypophysectomy.

REPLACEMENT THERAPY

...pite the profound effects of the removal of the pituitary gland, replacement
...apy can be effective in preventing or curing the changes observed. Even before
...ith (1927, 1930) first convincingly demonstrated that a hypophysectomized rat
...ld be maintained in an essentially normal condition by repeated implantation
...resh rat anterior lobe tissue, it was known that the administration of anterior
...itary preparations to normal animals could induce striking morphological and
...ctional changes. For convenience such changes may be considered under two
...in headings:—

*...HE INFLUENCE ON THE SEXUAL CYCLE OF THE ADMINISTRATION
... ANTERIOR PITUITARY PREPARATIONS.*—That implantation of anterior
...uitary tissue into infantile mice and rats can induce *precocious puberty*, with
...icular maturation and ovulation in female animals, was independently discovered
...1926 by a number of workers (Smith, Zondek, Aschheim), and the fact that the
...erior lobe of the pituitary gland enlarges during pregnancy, and appears to be
...peractive, then led to the discovery of the presence in the body fluids and urine
...pregnant women of a substance which could itself induce maturation of follicles
...th luteinization when administered to immature mice. This was the basis of the
...chheim-Zondek pregnancy test. It was first assumed, perhaps naturally but
...rtainly incorrectly, that this gonadotropic substance of pregnancy urine was
...entical with that of the pituitary gland.

...In 1929, Zondek reported the presence in the urine of menopausal women of
...substance which was gonadotropic but differed qualitatively from that of
...egnancy urine, since it appeared to be more specific in stimulating limited follicle
...aturation. A similar substance was also found in the urine of castrated women.
...ondek postulated that the gonadotropin in the urine of menopausal or of castrated
...omen was also of pituitary origin but different from that in the urine of pregnancy.

He named it "prolan A", whilst that in pregnancy urine became "prol.. Zondek therefore concluded that the pituitary gland elaborates two di‍ gonadotropins, and in this he was right, even though his belief was partl‍ on an incorrect assumption.

Follicular stimulation.—It is now widely accepted that the anterior ... lobe secretes two gonadotropins, which have been named "follicle stim‍ hormone" (FSH) and "interstitial cell stimulating hormone" (ICSH), respe‍. The gonadotropin in urine from menopausal and castrate women may be ‍ with FSH, but ICSH, which is sometimes known as "luteinizing hormone" ‍ differs in physiological and chemical properties from the gonadotropin of ‍ urine. The latter is now better known as the "chorionic gonadotropin of ‍ urine," since there is evidence that it is elaborated in the chorionic tissue of placenta. The two pituitary gonadotropins, FSH and ICSH, are distinct ... and have been obtained in a state close to chemical purity; they appear to proteins containing combined carbohydrate, not unlike the so-called mucoid blood serum.   The administration of FSH induces limited ovarian ‍ development in the female, and development of the testicular seminiferous tub in the male. The administration of ICSH to a female animal possessing foll‍ which have matured under the influence of FSH completes the follicular ‍ tion, and induces ovulation with subsequent formation of luteal tissue. In ‍ sexes ICSH elicits the secretion of sex hormones (androgens or œstrogens) b‍ interstitial tissue of the gonads.

Although, by the combined action of FSH and ICSH, ovulation and ‍. luteum formation occur in the ovary, it has recently been suggested that‍ cooperative activity of a third pituitary hormone—the so-called "lactog‍ hormone" (prolactin)—is necessary in order that the luteal tissue may be ‍ of elaborating progesterone and thus of preparing the uterine mucosa for ‍ implantation of a fertilized ovum.

Thus, as the result of pituitary activity, the female animal may go on heat ‍ ovulate, whilst the sexual activity of the male is also stirred. If, as the ‍ fertile coitus takes place and chorionic tissue is formed, this then elaborates‍ own gonadotropin, the function of which is at present obscure. It may ‍ mentioned, however, that the maintenance of the corpus luteum of preg‍ has been suggested as one possible function of chorionic gonadotropin.

It is clear that the provision of the material required for the growth of the f‍ and for the production of milk after parturition, necessitates alterations in ‍ metabolism of the animal, and here, again, anterior pituitary secretions are proba‍ concerned.

THE INFLUENCE OF THE ADMINISTRATION OF ANTERIOR PITUIT‍ EXTRACTS ON THE METABOLISM OF THE NORMAL ANIMAL.—T‍ administration of anterior pituitary extract to a normal animal leads to enhan‍ secretory activity of the thyroid gland and of the adrenal cortex. An augmen‍ secretion of the hormones of these two glands would be expected to lead, in s‍ total, to a rise in the basal metabolic rate, with an increase in the rate at which ‍ and protein are oxidized. Unless the food intake rises substantially these eff‍ would result in a fall in body weight, with negative nitrogen balance, in an ad‍

:l. The change, if any, in the rate of oxidation of carbohydrate in these
:nstances would be uncertain, since thyroid accelerates, whilst adrenal cortical
;ne depresses, carbohydrate combustion. In practice. it is found that the
:idministration of anterior pituitary extract to an adult animal on an adequate
:sually leads to the expected rise in basal metabolic rate associated with an
:se in the rate of fat oxidation, but the rate at which both protein and carbo-
:te are oxidized is depressed, so that nitrogen is retained and the body weight
:even in the absence of extra food. If the animal is allowed to eat *ad libitum*,
:ary treatment may induce a substantial increase in appetite and a rapid rise
:dy weight. The mechanism whereby the oxidation of protein is depressed
:ugh catabolism of protein would be expected to follow enhanced activity of the
:id gland, and of the adrenal cortex (Tepperman, Engel and Long, 1943)—is
:lear, but it seems possible that the retention of protein is contingent upon
:pility of the pancreatic islets to augment substantially their rate of secretion
:sulin. The energy that is no longer available because of the depression of
:tion of protein and of carbohydrate is balanced, and usually more than
:ced, by a rise in the amount of energy available from the oxidation of fat.
:efore, in general, the pituitary-treated intact animal oxidizes less. carbo-
:ate and protein and more fat.
: some animals, such as the adult dog and cat, the depression of carbohydrate
:ation which follows the administration of pituitary extract is so profound that
:blood sugar level may rise and a condition of *diabetes mellitus* develop.
:iltant damage to the islets of Langerhans may cause the diabetic condition
:ersist after the cessation of pituitary treatment and to become permanently
:plished (Young, 1937). Possibly, as a reaction against the ability of the
:itary extract to inhibit carbohydrate oxidation, the pancreatic islets may
:ertrophy to such an extent that, in other species, a diabetic condition does not
:lop. In such instances the most obvious response to the daily administration
:nterior pituitary extract may be an *increase in growth rate*, without the develop-
:it of diabetes, as seen in the puppy (in contradistinction to the adult dog;
:'ng, 1941) and in the rat. The acceleration in the rate at which the body weight
:'eases is more marked if the animal is allowed to eat *ad libitum*, since the
:iitary treatment results in an increase of appetite.
:*actation.*—In lactating animals, such as the cow (Folley and Young, 1941), the
:iinistration of the same crude pituitary extract as induces growth in puppies
:'ats, and diabetes in adult dogs, may elicit an increase in the amount of milk
::eted, an increase much greater than is obtained with prolactin alone. Undoubt-
:'y the stimulation of the complex processes leading to milk production requires
: operation of more than one anterior pituitary principle, of which prolactin
:e principle which induces growth of the pigeon crop gland) is but one (Folley
:d Young, 1941). In animals with mammary glands which are suitably developed
:t not secreting milk the administration of anterior pituitary extract may initiate
:tation.
:Is there any common metabolic change underlying these protean effects of the
:ministration of anterior pituitary extract? Although no final answer can be given,
:may be pointed out that in every case the action of the pituitary preparation

preserves from oxidation, and thus makes available for divers purposes, ma.
which would otherwise be oxidized. Since pituitary treatment induces polyph.
the energy balance may be maintained by a greater consumption of food, b.
extra food is not available the deficit can be made up by the oxidation of
animal's stored fat, the replenishment of the fat stores depending upon the am·
of dietary fat and carbohydrate taken. Over-accentuation of these processes
lead to the development of the pathological condition of diabetes mellitus.

Consider, in this connexion, a female animal who, as the result of an enha.
secretion of pituitary gonadotropins in suitable circumstances, carries a develop·
fœtus. The growth and development *in utero* of the young, together with its p·
partum nourishment, require that some part of the mother's food be devi.
from its normal pathway of oxidation in order to provide the necessary bui
materials. That this process depends to some extent upon pituitary activity of
kind envisaged above seems probable. If this is so, it may be suggested that
influence of the anterior pituitary gland is concerned with the inhibition of
oxidation of foodstuff in order to provide for (*a*) fœtal development; (*b*) milk
the young after birth; and (*c*) development of the body of the young independ.
animal. When puberty is reached, pituitary gonadotropins may then induce
adult animal to set in motion a similar sequence of processes.

THE SEPARATE EXISTENCE OF DIFFERENT ANTERIOR PITUITARY HORMONES

It may now be asked how many different anterior pituitary hormones are concer
in these somewhat complicated processes? At the present time the number
physiologically active and chemically differentiated substances which have b
separated from anterior pituitary tissue is five:—

    (1) Follicle stimulating hormone.
    (2) Interstitial cell stimulating hormone.
    (3) Prolactin.
    (4) Thyrotropin.
    (5) Adrenocorticotropin.

A sixth substance—growth hormone (H. M. Evans), with ability to induce
increase of body weight in hypophysectomized rats—has been prepared in a st
approaching purity.

The tissue of the anterior pituitary gland contains only three histologic
distinguishable types of cell, of which perhaps two only are secretory. This f.
has led some investigators to doubt the possibility of a separate existence in t
gland itself of five or six different hormones, because of a belief that one typ
cell can secrete only one hormone. But it is only necessary to consider the l·
number of different substances which must be elaborated in a unicellular organis
or the multiplicity of functions ascribed to the cells of the liver, to admit t.
on the molecular scale, a single type of cell must be capable of manufacturing a g·
number of substances. Moreover most, if not all, of the pituitary principles app·
to be of a protein-like nature, and an almost infinite variety of different pro·
structures can be produced by variations in the amount, and position in
molecule, of the constituent amino-acids. It is apparent that, *à priori*, there

n to doubt the ability of but two types of anterior pituitary cell to elaborate
ozen protein hormones, each of which might possess specific physiological

That at least four substances exist separately in anterior pituitary tissue
red highly probable from the variations observed in the relative physiolo-
:ivities of pituitary glands from different species of animal (fig. 1). Inci-
, this figure illustrates clearly why the type of physiological activity
l should influence greatly the source from which a pituitary extract'is to
ared for therapeutic purposes.
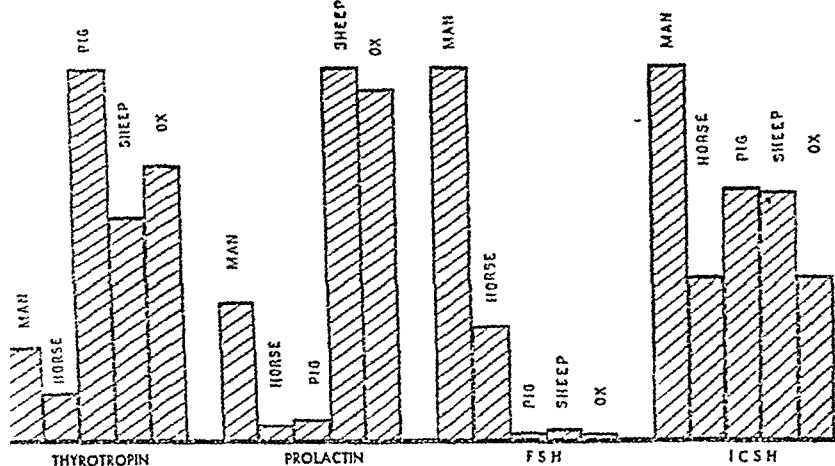
. 1. Relative activities of anterior pituitary tissues from five species (Chance, Rowlands
and Young, 1939).

n Dyke, Chow, Greep and Rothen (1942) have isolated from posterior
ary tissue a protein which possesses pressor, oxytocic and antidiuretic
ties in the proportions found in the fresh pituitary tissue. They suggest that
protein is the hormone elaborated by the posterior pituitary tissue itself, and
the separation of pitressin and oxytocin, as carried out in the laboratory,
ves the chemical fission of the native hormone. It is clear that a similar state
fairs may exist with respect to anterior pituitary hormones, although the
ence regarding this is not yet clear. The clinical association of diabetes with
megaly is sometimes quoted in this connexion, but diabetes is also frequently
d with Cushing's syndrome. Dwarfism is sometimes allied with gonadal
:iency, but not necessarily so. It is conceivable that the anterior pituitary lobe
etes one or more large molecules with multiple physiological activities and that
e may fragment, in different ways under different pathological conditions,
ive the variety of syndromes encountered in anterior pituitary dysfunctions.
n experimental chronic undernutrition a general depression of endocrine activity
· develop in which anterior pituitary therapy can restore the depressed glands
oite continuation of underfeeding (Mulinos and Pomerantz, 1941). It is suggested
: this condition, which has been named "pseudohypophysectomy," can be
ibed to a depression of anterior pituitary function resulting from the inadequate
rition. The possible relation of this condition to the dysfunctions resulting from

anorexia nervosa is of interest.   In other conditions, particularly those result
from stress of different kinds, the secretory activity of the anterior lobe
to be depressed with respect to some principles and enhanced in regard to
For instance, in complete starvation, in contrast to chronic under-
the adrenal cortex hypertrophies, although most other endocrine organs
the inhibition of growth and of gonadal activity that may result from
deficiencies is also well recognized.   It may be pointed out that, in nearly
conditions of stress, hypertrophy of the adrenal cortex, probably of pituitary
occurs, whatever changes may take place in the rest of the endocrine system.
teleological grounds it might be suggested that in abnormal·conditions the
gland so modifies its secretory activity with respect to its different hormones
inhibit non-essential activities, e.g., growth and sexual pursuits, in order to
tain, for as long as possible under the conditions obtaining, the vital processes
energy and heat production.

CONTROL OF SECRETORY ACTIVITY OF THE ANTERIOR PITUITARY

Under normal conditions of life it seems probable that concentration of circul
thyroid hormone controls the rate of secretion of pituitary thyrotropin, a rise
circulating thyroid hormone depressing the secretion of thyrotropin, whilst a
enhances it.   A similar state of affairs probably exists with respect to circula
sex hormones and pituitary gonadotropins, and in regard to the hormones of
adrenal cortex and pituitary adrenocorticotropin.   Such a mechanism wo
provide a simple balanced control of the rate of secretion of the pituitary
principles in relation to the body's requirements for the hormones liberated ur
their influence, but, although this may be operative under normal condition
would not account for the more complex changes discussed in the previous sect
Such changes probably subscribe to a controlling mechanism outside the
gland and the organs it influences, and a mechanism of this sort exists in hyp
thalamic centres.

Fisher, Ingram and Ranson (1938) have provided good evidence that
secretory activity of the posterior lobe of the pituitary gland is under the
of the supra-optic nuclei in the hypothalamus, and there is much indirect evid
that the secretion of anterior pituitary principles may also be subject to nerv
influence, although the pathways concerned have not been clearly
Thus, section of the pituitary stalk inhibits the normal secretory response to c
on the part of the thyroid gland (Uotila, 1939), whilst in some species of anir
ovulation is normally induced only as the result of coitus, and nervous refle
probably involving the hypothalamus, appear to be concerned.   The influence
light and of temperature on the mating habits of animals, and the phenomen
sexual display and courtship, are all processes in which the anterior pituit
stimulation by hypothalamic centres may be involved (Marshall, 1942).

The obesity which follows damage to the hypothalamus has been mentio
above.   It is developed even in hypophysectomized animals (Hetherington, 19
and is probably the result of the stimulation of the appetite to such an extent
more food is taken in than is required for oxidative purposes.   It is believed t
hypothalamic obesity in the dog results from destruction or denervation of

ypophysis and destruction or retrograde degeneration of the paired caudal
ntricular nuclei of the hypothalamus (Heinbecker, White and Rolf, 1944).
halamic damage may be followed also by hypersensitivity to the hypo-
mia of insulin and diminution in the intensity of pancreatic diabetes, and
ne instances an increase in the amount of islet tissue present in the pancreas
een claimed; but other hypothalamic lesions may induce glycosuria. The
ation of the problems which thus arise is a matter for future research, but
: meantime it can be inferred that in some way the anterior pituitary gland
able of acting as a relay mechanism for the conversion of nervous stimuli to
umoral agencies concerned with the coordination of endocrine activity, with
ct to both sex phenomena and metabolic functions.

ANTERIOR PITUITARY THERAPY

1 the balanced integration of the endocrine system which must be normally
tained is borne in mind, an integration in which the anterior lobe of the
ary gland plays such an important part, it is perhaps not surprising that when
alance is lost it is not easily regained with the relatively crude methods of
herapy now available. Furthermore, when the varied proportions of the
al principles found in anterior lobe tissue from different animals (cf. fig. 1) are
idered and the present ignorance of the proportions of these principles most
or administration to any particular case, the difficulties of successful clinical
ment are clear. Similar considerations would point to the multiplicity of the
rome complexes to be expected as the result of pathological changes in the
rior pituitary gland, which might or might not involve the posterior lobe and
djacent hypothalamic structures; but here realization has preceded possible
ctation.

perimental and clinical research have already provided much knowledge
erning the pituitary gland. But still more is required before the tools which
ow being forged can be utilized with maximal efficiency.

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THE "HARMLESS" GOITRE

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THERE must be many thousands of adults—chiefly women—in this cou: in whom the presence of a goitre has never been suspected by them or by t family practitioners, or in whom a goitre evident to both has been adju "harmless" by their medical advisers. It is, indeed, an almost everyday experi of those whose duty it is to see many goitres in the course of a year to be told the patient: "I've had the swelling in the neck for years, but I never paid attention to it" or, almost as frequently, "My doctor told me that it'd never r any harm and I was to forget it." The object of this short article is to suggest these goitres, whether noticed or unnoticed, are not so harmless as they are so v considered to be, not only by general practitioners but also by consultants.

INCIDENCE

What proportion of the population harbours such goitres it is impossible to A medical practitioner who is goitre-conscious and conscientiously examine: neck of every patient who comes into his consulting-room, and who then g instinctively at the necks of women sitting opposite him in trains, buses, restaur and so on (as he will almost certainly find himself doing), will soon come to conclusion that it is a considerable one.

PATHOGENESIS

A few of these goitres undoubtedly derive from congenital fœtal adenomas, w' childhood may sometimes be felt as small, discrete nodules, single or multiple,' possibly the size of a pea or nut. They never disappear spontaneously and r regress; on the contrary, they grow slowly but steadily, sometimes to a large The rest of the gland is generally unaffected by their presence for many year may so continue to be, but often before middle life is reached, if not ea a nodular goitre has developed with adenomas clinically indistinguishable from fœtal adenoma or adenomas still present in its substance, so that many have that fœtal adenoma of the thyroid is non-existent.

A fœtal adenoma seldom produces symptoms until many years have elapsed then it may displace the trachea to such a degree that pressure symptoms are ca it may be the seat of sudden hæmorrhage, causing pain, swelling and frig sensations of suffocation; as part and parcel of a nodular goitre it may share its or it may become malignant. Malignant goitres are comparatively rare, but well to remember that the large majority of them originate from fœtal adenom: The origin, however, of the other and far more numerous harmless goitre

life is frankly unknown. To say that many of them date from puberty when, well known, goitres are fairly common, is not of much help. A great number berty goitres appear to be due to temporary physiological disturbances and pear completely in time, with or without the small doses of iodine or thyroid ly administered, but for unknown reasons some persist. There are also many es of unknown origin which appear before puberty—even in early childhood— it any time after it.

ithout attempting to embark upon a scientific discussion of their complex and ult pathological differences, it may be said that clinically such goitres can hly be divided into two groups—uniform and nodular —of which the latter is h the larger. It is doubtful, however, if much is gained by such a division. one thing, it must be an inaccurate one, since it depends entirely upon the e of touch of the individual examiner, and many a goitre deemed uniform pre- atively is found at operation to be nodular, and for another a uniform goitre a becomes nodular in the course of years. In addition they may be bilateral, ateral or mesial, protuberant or deeply placed, partly or (rarely) wholly sub- al, adenomatous, cystic, or colloid, or a mixture of the last three; they may be fied in part, and they are of all sizes and shapes.

SYMPTOMS AND SIGNS

ew of the fact that it is generally recognized that the well-known condition, adenoma, is due to the activation of a non-toxic nodular goitre, either igh the agency of unknown factors or of such factors as acute infection, nancy, parturition, the puerperium or the menopause, and that, so far as is m, any such goitre is liable to undergo this change, it is curious that every one e types of goitre considered in this article is not taken more seriously as being a ntial danger. The reason is not far to seek. The average practitioner is only ainted with the gross symptoms and signs of thyrotoxicosis, and during the le of his professional life probably sees few patients with non-toxic goitres develop such gross clinical manifestations; the large majority of non-toxic res appear to him to continue on their non-toxic way indefinitely, and, even the end cardiac symptoms—to which reference is made on p. 140—arise, ails to associate them with the goitre. It is, however, the conviction at the End Goitre Clinic that not only do nearly all goitres eventually become toxic, that by the time early middle life is reached cases of goitre without some ence of toxicity are rare. This conviction is shared by many experienced rvers in different parts of the world. In most cases, however, the symptoms of otoxicosis are so mild that they have to be sought diligently. They may be nore than a feeling of constant lassitude, a certain degree of emotional instability essed in tears, nervousness or irritability, often noticed by relatives or friends er than by the patient herself; loss of weight, irregular sweatings or "hot turns," slight sustained rise of the resting or, better, sleeping pulse rate. There may be a fine digital tremor and, to a trained observer, the suspicion of a stare, a it retraction of the upper lids or an almost imperceptible difference in the size of palpebral fissures. Definite exophthalmos is almost unknown in these patients.

The fact that in many there may be phases of exacerbation and intermiss
symptoms does not make their discovery easier. When any reasonable
exists as to the presence of thyrotoxicosis occasional help may lie in a rapid
ment of symptoms brought about by a ten days' course of iodine, but, as a
the effect of iodine in these cases is not dramatic.

Basal metabolic rate.—It will almost certainly be urged that an estimation
basal metabolic rate will solve the problem. Unfortunately it seldom does; so
is the general metabolism affected by such mild degrees of thyrotoxicosis. It
be said in passing that although an estimation of the basal metabolic rate i
occasions of the greatest help in the diagnosis of thyrotoxicosis, it is, by and
a fallible test. With increasing experience there is a tendency to rely less and
upon it and more and more upon clinical examination, in which a careful
almost certainly holds first place.

Cardiac symptoms.—It is not the presence of symptoms such as have
described, mildly annoying as they sometimes are to patients over a long
years, which makes these goitres so important, nor is it the fact that they may
large enough to exert serious pressure on the trachea or that they may
become malignant; it is the danger of their ultimately causing heart disease.
now widely recognized that auricular fibrillation, generally paroxysmal at
later established, is a frequent complication of toxic goitre, but it might be
that, as regards the goitres under survey, their toxicity is so mild that it sho
seldom encountered. This is not the case. Opinions differ considerably
the frequency of its occurrence, but a long and growing experience of toxic
compels the belief that the vast majority of patients with these "grumbling"
are, if untreated, doomed to suffer from auricular fibrillation and, later,
failure, unless they chance to succumb to some other disease in the
The carrying out of the sentence may be deferred for twenty, thirty, or even
years, but comparatively few escape. It is well to remember, too, that one of
goitres can by itself cause auricular fibrillation in a patient who is suffering
rheumatic heart disease or is the subject of hypertension; indeed, in a far
negligible proportion of cases of auricular fibrillation associated with the latte
fibrillation is due to a goitre, the toxicity and even the presence of which
been suspected.

TREATMENT

If for no other reason than that they are the most common sources of
—and there are other reasons, as already shown—fœtal adenomas demand re
Fortunately, there is no need for this to be undertaken in childhood, since
without exception these adenomas continue harmless for many years. Once,
ever, the growth of the boy or girl is ended there seems to be no logical
in favour of their further retention. I am fortified in this opinion by a
experience:—

I saw a strong, healthy girl, aged twenty-three, who was suddenly seized with
pain in the neck and a sensation of suffocation caused by a hæmorrhage into a fœtal ade
the existence of which was unknown beforehand, either to her or to her father, a medica

As regards the treatment of the far commoner non-toxic and mildly toxic goitres
described, it can be said at once that whether *iodine* has or has not any beneficial
effect upon puberty goitres, it has none on the non-toxic goitres of adult life;
does not prevent the advent of thyrotoxicosis in the latter and it does not provide
cure when this is present. For unknown reasons it tends to abate thyrotoxic
symptoms temporarily in all types of toxic goitre, especially in the primary
"graves" type, and therefore is of great value when administered for a short period
before and immediately after operation and, as would be expected, especially in
cases of primary goitre; but there its use should end. Nevertheless, it is a rarity
to see a patient with toxic goitre or, for that matter, non-toxic goitre, who has not
been subjected to iodine therapy for months or even years.

Latterly, the virtue of two organic sulphur compounds, known as *thiourea* and
thiouracil, have been widely advertised. Enthusiasts are already preaching that
there is now no need for operation save to relieve pressure symptoms, or for
cosmetic reasons. That these preparations administered orally can inhibit
thyroid activity and so alleviate thyrotoxic symptoms there is no doubt; through
their administration a number of patients have been enabled not only to
resume their normal activities but to maintain them for so long as the treatment
is kept up. At the same time they are potent drugs; potent, it would seem, occa-
sionally for evil as well as for good. There have been already many communications
from workers, both in America and in this country, showing that such toxic effects
as dermatitis, fever, leucopenia and agranulocytosis can be caused by them, and
stressing the importance of close observation in all cases in which they are being
given. Moreover, there are some patients who are unable to persist with the
treatment on account of the nausea it sometime produces, and there are others
who prove to be recalcitrant to it. Nor is there any convincing evidence up to date
that they cure. My experience of the treatment has not been altogether happy
and at the moment I am loth to advise it as a curative measure for the long periods
advocated. As a matter of fact, these mildly toxic nodular goitres seem to be least
affected by the preparations; as in the case of iodine it is the acute primary toxic
goitres which benefit most. Its use as a pre-operative measure in cases of primary
goitre of severe toxicity is another matter.

Surgical intervention.—Practically all goitres in adult life should be operated upon
without much delay. This is the argument:—No cardiologist of repute would to-day
advise any other method of treatment save subtotal thyroidectomy for a manifestly
toxic goitre associated with auricular fibrillation, whether paroxysmal or established,
since the results are, generally speaking, extremely gratifying: attacks of paroxysmal
fibrillation almost always cease; normal rhythm returns spontaneously in a certain
proportion of cases of established fibrillation, in others it may be restored through
the administration of quinidine, and in cases in which this fails the ventricular rate
can almost always be easily controlled by digitalis. Nor would he advise any other
treatment in a case of auricular fibrillation when no reasonable cause for it can be
found save in the presence of a goitre of doubtful toxicity. But auricular fibrillation
is a late indication for operation; the heart must almost certainly have been affected
for a considerable time by the toxic process before it supervenes. The truth
of this is possibly borne out by the fact that it is far from rare for a patient with

a goitre either accounted completely non-toxic or of minimal toxicity to devel-
on treatment attacks of auricular fibrillation soon after subtotal thyroidectomy. I
this be so, it would seem only reasonable to operate while the heart is still but
affected. After all, a surgeon does not wait for the appearance of secondaries before
he operates upon a cancer of the breast.

It is only pressing the argument a little further to urge that if the end of most
"harmless" goitres in adults be, as it is believed to be, a goitre heart leading to
auricular fibrillation and thence to congestive failure, and there is no way of
knowing which one will escape, operation should not long be deferred once the
goitre is discovered. The fact that many of them not only grow large enough
to become unsightly but also distort the trachea and cause pressure symptoms
strengthens the argument for operation. Nor is it a mean achievement to rid
most patients of their symptoms, mild as they may have been, for, in my exper-
ience, no operation in surgery can call forth more gratitude than a subtotal
thyroidectomy in patients with "grumbling" goitres which up till then have
been considered harmless. Over and over again such patients insist that they
feel different women, even though they may be hard put to it to explain what
they mean by the expression. Again, for psychological reasons alone it is well to
remove a goitre from a woman's neck. Ask her how many times a day she feels it
with her fingers and looks at it in the glass, wondering if it is growing and becoming
cancerous, and the anxiety its presence causes will, to some extent, be appreciated
Thiourea and thiouracil do not bring about the disappearance of goitres; rather
do they tend to cause an increase in their size. It will be argued that subtotal
thyroidectomy carries with it a serious risk to life. At one time it certainly did, but
to-day in good hands the operative mortality rate in all cases of toxic goitre
primary and secondary, mildly and acutely thyrotoxic, with and without auricular
fibrillation, with and without congestive failure, ought not to be more than a little
over 1 per cent., and in these non-toxic or mildly toxic cases it should be, and is
almost negligible. Nor, if the operation is properly performed, is there much likeli-
hood of regrowth of the gland: it is the primary toxic goitre of the Graves's type
which especially tends to recur. As against recent methods of treatment of these
non-toxic or mildly toxic goitres, operation offers a prospect of quick removal of
the tumour once and for all, a rapid disappearance of symptoms, if present, and
a convalescence of only a few weeks' duration. Moreover, it is likely that in the end
it entails a lower mortality.

DISEASES OF THE SUPRARENAL GLANDS

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RGANIC disease of the suprarenal glands is rare in comparison to the
ely frequent occurrence of disorders of the thyroid, ovaries and pituitary.
probable that many morbid physical symptoms, psychological states, and
malities of sexual behaviour, owe their origin to functional disturbances of
drenals, but proof is lacking of the precise part played by these glands in the
iction of functional disorders, and it is essential to confine an article of this
h to what is relatively well known rather than to engage in surmise, however
iating such speculation may be.

ADDISON'S DISEASE

s been established that Addison's disease is the result of deficiency of the
ial cortical hormone. The exact function of this hormone is still controversial,
here is no doubt that, when it is lacking, sodium and water are excreted in
ss from the blood into the urine, whilst potassium is retained and, in addition,
e fundamental disturbance of carbohydrate metabolism takes place, resulting
ypoglycæmia. In association with these changes in body chemistry, concentra-
of the blood occurs, with a diminution in plasma volume. The changes which
ern sodium, potassium and diminished blood volume are so interdependent
it is difficult to determine which of them is initially responsible for the
lrome.

TIOLOGY.—Addison's disease occurs rather more commonly in males than
emales and is rare in childhood and old age. It was formerly believed that
er cent. of the cases were due to fibro-caseous tuberculosis of the adrenals,
lly associated with glandular or healed intrathoracic lesions and occasionally
active pulmonary tuberculosis. Modern figures suggest that tuberculosis is
ss common etiological factor and that atrophy and aplasia of the cortex account
50 per cent. of the cases, whilst a few are due to syphilis and to carcinoma.

IGNS AND SYMPTOMS.—Little of clinical importance has been added to
lison's original description of the disease in 1855: "The leading and character-
: features of the morbid state to which I would direct attention are anæmia,
eral languor and debility, remarkable feebleness of the heart's action, irritability
he stomach and a peculiar change in the colour of the skin." The disease usually
ts insidiously and its specific symptoms may be masked by a coincident toxæmia
m active tuberculosis. Sometimes a preceding history of "influenza" is given,
ich may in reality have been an acute initial phase of adrenal failure.

Pigmentation.—The pigmentation of the skin is the most characteristic and
gnostic feature of the disease. It is said to be due to the failure of the diseased
nd to convert the natural adrenaline precursor (melanogen) into adrenaline,
ding to its vicarious utilization by the skin in the formation of increased amounts
the alternative end-product—melanin. The pigmentation is usually general in
tribution, although more marked in certain areas, but rarely it may occur in
codermic patterns. It is most obvious on the parts exposed to light, pressure

and friction. The colour varies in depth from case to case but closely resemble the pigmentation seen in Indian races. As usually occurs in Indians also, the sole and palms escape, so that the contrast between them and the rest of the hands feet is striking. The nipples are generally very dark or almost black in colour, deep purplish patches of pigmentation may be present on the palate, the lips the inside of the cheeks; similar to those seen in the mouth of a black spaniel.

Asthenia.—Complaints of weakness, lassitude and apathy are invariable. The patient usually sleeps heavily and is difficult to rouse in the mornings. All muscles are weak and tire easily, as opposed to the weakness of groups of muscles in myasthenia and ischæmia. A progressive loss in weight is the most dependable sign of deterioration in a case, and a gain in weight of improvement. Amenorrhœa and impotence are common.

Gastro-intestinal symptoms.—The untreated patient is always anorexic and nauseated and constipated. The constipation is occasionally varied by bouts intractable diarrhœa. Achlorhydria is usually present. Attacks of abdominal pain frequently occur, the exact cause of which is often obscure; they may be mistaken for acute abdominal emergencies.

Cardiovascular signs.—The blood pressure is characteristically low, in the region of 90 mm. Hg systolic and 50 diastolic. Readings up to 120, however, may occasionally be encountered, even in untreated cases. The pulse tends to be rapid the heart sounds to be poorly heard.

Hæmatology.—A microcytic hypochromic anæmia is present, which may not be apparent on hæmatological examination, owing to the obscuring effect of the associated hæmoconcentration. The anæmia is accompanied by a leucopenia a relative lymphocytosis.

Blood chemistry.—In the ordinary case there may be little or no change in the blood chemistry, but in Addisonian crisis, or approaching crisis, the blood urea and inorganic phosphate concentration are increased. Creatinuria occurs, due breakdown of muscle tissue, and a negative total nitrogen balance is established. There is a greatly increased excretion of sodium and chlorides, with a fall in the serum values and a corresponding rise in the serum potassium concentration. The blood sugar tends to be low. The chemical state of a patient suffering from adrenal insufficiency is thus comparable to that found in other conditions characterized by dehydration and salt depletion, such as high intestinal obstruction.

DIAGNOSIS.—The diagnosis of a well-marked case of Addison's disease showing characteristic pigmentation, muscular asthenia, hypotension and gastric disturbances, is not difficult. In theory the differential diagnosis involves a number of conditions, including myasthenia, chronic arsenical poisoning, vagabond's disease and Simmond's disease. In practice the condition is most often confused with carcinoma of the stomach, hæmochromatosis and neurasthenia. It can be differentiated from the two former by X-rays of the stomach in the one instance and by discovering a large liver and glycosuria in the other. An early case of Addison's disease, however, without much pigmentation and without changes in blood chemistry, may be dismissed as hypochondriacal neurasthenia, and the differentiation may be difficult.

Calcification of the adrenals due to healed tuberculous lesions may be present in a proportion of cases and when demonstrated radiologically may clinch the

gnosis. In addition, the reaction of the patient to sodium chloride deprivation, to the feeding of potassium salts, may be of diagnostic value. As such measures may precipitate a serious crisis they are hardly justifiable, and are certainly justifiable outside hospital. A sodium and potassium balance test has been vised (Cutler, Power and Wilder, 1938) which is, however, too complicated to form except in a metabolic ward, and is also not free from risk. When real gnostic doubt exists the therapeutic test should be employed.

COURSE AND PROGNOSIS.—Before the introduction of modern therapeutic easures the disease progressed inexorably to a fatal issue in periods of time varying m six months to not much more than two years. Some of the patients softly and ently vanished away in a process of gradual dissolution. More often death curred in a crisis, characterized by a high temperature, intractable vomiting, lirium, severe dehydration and shock. Such crises, which may occur quite ddenly, are usually precipitated by an intercurrent infection, sometimes of a ivial nature—since patients with Addison's disease are notoriously sensitive to fections and toxins—or by the administration of drugs, such as morphine, or esthetics, to which they are also extremely intolerant.

Since the introduction of potent substitution therapy the prognosis has greatly nproved, although the life of a patient with Addison's disease is always precarious. luring the last eight years nine cases have been under my observation:—

Three patients died; one from generalized tuberculosis, and two in Addisonian crises recipitated by pneumonia in one case, and the administration of a general anæsthetic in ie other; the remaining six have survived for periods varying from three to seven years rom the onset of their symptoms; they have had their "ups and downs," but are all at present in wonderfully good health, actively engaged in more or less sedentary occupations; ne of them is actually an officer in the Army, although not in a highly belligerent capacity.

TREATMENT.—In *Addisonian crisis* treatment consists in the administration of arge doses of cortical extract and in combating the shock, dehydration, hypolycæmia and sodium depletion by warmth and the administration by intravenous rip of 5 per cent. glucose in saline. From three to six pints may be given at the ate of one pint every four hours.

Cortical extract is sold commercially as cortin (Organon) (1 c.cm. = 50 gm. of hole gland), eschatin (Parke, Davis) (1 c.cm. = 40 gm. of cortex), and eucortone Allen and Hanburys) (1 c.cm. = 75 gm. of cortex). Initially, 20 to 30 c.cm. of ne of these preparations should be given intravenously. During crises patients ommonly react severely with a sharp febrile attack to this parenteral treatment; his should not, however, deter the practitioner. Thereafter the hormone should e given intramuscularly in 10 c.cm. doses every six hours, the frequency of the lose being gradually reduced as the crisis subsides. The treatment unfortunately s expensive.

Maintenance.—In 1937 an essential principle of the adrenal cortex was isolated, named corticosterone, and it has since proved possible to synthesize a closely allied ompound—desoxycorticosterone-acetate (D.C.A.)—which possesses the essential biological properties of corticosterone. Of all the compounds isolated from the drenal cortex, D.C.A. has the greatest action in conserving sodium chloride nd water and in causing excretion of potassium. It has little demonstrable effect n maintaining normal carbohydrate metabolism. As it does not provide complete ubstitution for normal adrenal cortex it is better to adhere to cortical extracts or the rescue of patients during crises, especially as D.C.A. cannot be given intra-

venously. Nevertheless, owing to its somewhat lower cost, smaller bulk and strong effect in conserving sodium, it should be used in preference to cortin for maintenance treatment.

D.C.A. is inactive when swallowed and its administration sublabially as tablets or dissolved in propylene glycol, although effective, is wasteful and costly. 1 c.cm. of the preparation containing 5 mgm. of the drug, approximately equals 10 c.cm. of cortin, can be given intramuscularly, dissolved in sesame oil. Just as there is no "dose" of insulin so there is no "dose" of D.C.A. for maintenance treatment; a severe case may require 5 mgm. a day, a mild one may be maintained by as little as 5 mgm. a week. Dosage must be regulated by the patient's subjective symptoms, the blood pressure, the blood chemistry, and particularly by the weight which is the most reliable index of progress.

The most economical and least troublesome method of administering the synthetic preparation is by implantation. From 200 to 400 mgm. in the form of pellets are inserted into the deep subcutaneous tissues of the abdomen through a small incision, which can be closed by a single stitch. The effect of D.C.A. can thus be maintained for from six months to a year without the necessity of frequent oily intramuscular injections, unless an intercurrent infection should temporarily necessitate the potentiation of the implant. There is no reason to suppose that the body will absorb from the implant just the right amount of hormone needed for its normal function, and, although inadequate absorption may be made good by occasional injections, excessive absorption, giving rise to hypertension, and massive œdema if salt is given co-incidentally, can only be remedied by the surgical removal of the implant. Therefore, on theoretical grounds it would seem unjustifiable to implant crystalline hormones in large amounts and trust to nature to regulate wisely their subsequent absorption. Nevertheless, most satisfactory results can be recorded in six patients treated by this method. They have remained in good health and have not shown any serious toxic manifestations. One of them has had three implantations totalling 800 mgm., which have maintained him without injection for two and a half years.

Until the potent action of D.C.A. in causing retention of sodium was recognized, the basis of maintenance treatment consisted in the administration of sodium salts. An ample supply of this element lessens the requirement of cortin, and indeed it is sometimes possible to maintain health in mild cases by the use of sodium salts alone. Patients with Addison's disease are much more tolerant to sodium chloride than healthy subjects, and can take doses up to 15 grammes a day. Since the deficiency of sodium is more important than the deficiency of chloride, sodium citrate or bicarbonate may replace some of the sodium chloride. A suitable method consists in the administration during the day of a litre of water containing as a maximum, 10 gm. of sodium chloride and 5 gm. of sodium citrate, suitably flavoured. It must be remembered that D.C.A. has such powerful effects in causing retention of sodium that œdema easily results when large doses of D.C.A. and sodium salts are given simultaneously. Therefore, when D.C.A. is used rather than cortin, the total daily dose of sodium salt should never be more than 7½ gm., and this should be omitted on the first sign of œdema. Indeed some authorities now believe that salt additional to that taken with food should not be prescribed with D.C.A.

7ith the object of preventing an excessively high concentration of potassium
he blood, diets with a low potassium content have been prescribed, but this
iculous complication of treatment is superfluous, provided the mineral in the
n of medicine is excluded and adequate replacement therapy is instituted.

ADRENAL HÆMORRHAGE
(Friedrich-Waterhouse syndrome)

the course of fulminating purpuras and septicæmias—particularly acute
iingococcal septicæmia—hæmorrhage may occur into the adrenals. The
ilting disease, characterized by shock, intense purple cyanosis, ecchymotic
norrhages and a collapsed blood-pressure, presents an unforgettable clinical
:ure. The patient speedily relapses into unconsciousness and a fatal issue is
rule, sometimes within a few hours. Occasionally the adrenal apoplexy is not
iassive one and prompt and energetic treatment may save life. Apart from the
itment of the associated septicæmia with sulphonamides or penicillin, the
itment is the same as for severe Addisonian crisis (*vide supra*).

CORTICAL HYPERFUNCTION

is now certain that the adrenal cortex, in addition to producing one or more
:mones with a cortin-like action, also produces others with properties resembling
: sex hormones. One of these is identical with the hormone of the corpus luteum,
l the other is an androgenic-like hormone which antagonizes the follicular hor-
ine of the ovary. An excess secretion of cortical hormone thus suppresses femin-
ty, causing virilism in the female and an accentuation of male characteristics in
: developing child or youth. It has been recognized that hyperfunction of the
rtex gives rise to the following syndromes, according to the age at which the over-
:ivity occurs:—(1) In embryonic life to pseudo-hermaphroditism; (2) before
iberty to sexual precocity with coincident masculine changes in the female;
) at or after puberty to virilism in females (adreno-genital syndrome).

Pathology.—Hyperfunction of the cortex is due to cortical adenomas or car-
iomas. The former may be large and grow extremely slowly, but may eventually
:come malignant. The latter are highly malignant, and usually cause sexual
·ecocity. In females with virilism the ovaries are atrophied and the uterus small.

Pseudo-hermaphroditism.—In pseudo-hermaphroditism the individual has the
)nads of one sex and the secondary sex characteristics of the other, or a combina-
)n of both with various anomalies of the genital organs. The prognosis as to life
good, but little can be done to improve the condition.

Sexual precocity.—Sexual precocity may occur at any period before puberty,
·en in the first year of life, accompanied by abnormal strength and muscular
evelopment in the male. In girls the precocity is heterosexual, associated with
irsutism of male distribution and enlargement of the clitoris. The prognosis is
ad, owing to the frequency of a malignant etiology, but an attempt should be made
) remove the responsible tumour.

The adreno-genital syndrome presents a striking clinical picture. Adiposity occurs,
ssociated with numerous dark purplish striæ; there is hirsutism of the male type,
he unfortunate woman often becoming heavily bearded in spite of the fact that
he may lose much of the hair on her scalp, and the pubic hair spreads over the
bdomen and on to the thighs, whilst the legs and arms are thickly covered with

hair; the shoulder and pelvic girdles assume a male symmetry; the voice becom low pitched and menstruation ceases with an associated lack of libido; there hypertension, polycythæmia, with a characteristic dark flushed appearance, and hyperglycæmia with glycosuria. These physical traits are paralleled by changes personality, characterized by immodesty and the assumption of male attributes.

The whole clinical picture is practically indistinguishable from Cushing syndrome. Indeed the two conditions may simply be varieties of the same disorde in which either the pituitary or the adrenal may show the predominant patholog but in which neither gland completely escapes. When gross hypertrophy of the clitoris is present with an excess of androgens in the urine, an adrenal adenom is likely to be the most important factor, and *vice versa* when these signs are absen. The rare condition of arrhenoblastoma of the ovary is the only other condition which closely resembles the adreno-genital syndrome, but obesity is not a featur of arrhenoblastoma.

A striking reversion to normal follows the removal of a cortical adenoma, parti cularly if the syndrome has not persisted for many years. It is difficult to kno which adrenal is involved and both kidneys may have to be explored. A uroselectu examination occasionally shows the growth to be distorting one of the renal pelve or the tumour may be delineated radiologically after injecting air into the peri-rena space—a delicate and slightly hazardous procedure. Acute adrenal insufficienc may follow adrenalectomy, since the opposite adrenal may be partially atrophied D.C.A. should therefore be given for some days before and after operation.

MEDULLARY HYPERFUNCTION

There is no sound clinical evidence of any symptomatology definitely attributab to hypoplasia of the adrenal medulla, probably due to the fact that it is not th only source of chromophile tissue in the body. On the other hand, hype functioning tumours of chromophile tissue produce paroxysmal hypertensio. Such tumours are adenomatous and usually benign. They probably produce the effects by discharging pathological quantities of adrenaline into the blood.

In this rare condition a previously healthy young adult develops paroxysm attacks of hypertension, in which his blood pressure may suddenly rise from norm to between 200 and 300 mm. Hg. There is a corresponding, although less striking change in the diastolic pressure. During this paroxysm there is pallor, palpitatio. nausea, vomiting, cyanosis of the extremities, glycosuria, albuminuria, agonizin; headache and angina pectoris. After a variable but relatively short time the bloo pressure reverts to normal and the patient becomes perfectly well, until the nex attack supervenes. The condition eventually results in degenerative changes i the arterioles, and in ischæmic kidneys.

The clinical picture is so striking that diagnosis is easy during the paroxysm stage, when the removal of the adenoma is likely to cure the condition. Th difficulties of diagnosing which adrenal is involved and the dangers attendin; adrenalectomy are the same as in the adreno-genital syndrome (*vide supra*).

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THE MALE SEX HORMONES

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R so long has mankind possessed a knowledge of the importance of the testes
ormal physical and mental development that it is not possible to put even
proximate date to the earliest acquisition of that knowledge. Indeed it is
issible to regard this piece of biological information as a part of man's essential
al inheritance, which has been of necessity to him in developing the art and
ting the course of animal husbandry, so that suitable animals could be adapted ·
s needs. Thus, from the earliest times the practice of castration has been
ed out on domestic animals in order to render them suitable for fattening
to control and direct breeding.

HISTORICAL SURVEY

ne recognition of the profound influence of the gonads on physical and mental
lopment remained a fact of experience for centuries, and, whilst it may have
ulated speculation, it came under the searchlight of scientific inquiry only
ng the early nineteenth century when Berthold (1849), a physician of
tingen, performed beautifully conceived and executed experiments which
ed him the credit for having made the first direct approach to the investigation
ne mechanism of gonadal function. Berthold demonstrated that (1) castration
mmature male animals prevents the development of the secondary sexual
ns; (2) castration of sexually mature animals causes atrophy of the sexual
ns; (3) grafting of testicular tissue in castrated animals removes the deficiencies
sed by castration. To these three conclusions can now be added a fourth—that
administration of potent extracts of testicular tissue has the same effect as
icular graft. It is worth noting that Berthold's observations still influence
temporary investigative technique, in that his observation that implantation
esticular tissue into capons induced growth of the comb is still the basis of one
he principal methods of assay of testicular extracts, although the method has
ce been elaborated and made quantitative by Koch and his co-workers (1939).
These classic experiments were followed by a period during which active but
itless search was made for preparations of testicular tissue capable of inducing
effects of testicular implants. The invigorating and apparently rejuvenating
luence of the gland, clearly demonstrable by animal experiments, taken together
h the widely held but empirical belief that the infirmity of advancing years is
gely due to testicular atrophy, seemed to give hope that the decline of strength
d vigour inseparable from old age might be arrested by the administration of
ticular extract. This reasonable expectation provided fertile ground for quackery,
d for some decades totally inactive preparations have been offered for sale, the
armacological activity of which is in inverse proportion to the extravagance of
e claims made for them. A promising but disappointing attempt to improve the
docrine activity of the testes was made with the introduction of the Steinach
eration. This procedure was based on the assumption that the hormone of the

testes is elaborated by the interstitial cells of the gland. Steinach believed the ligature of the vas deferens would lead to degeneration of the seminiferous tubules and so promote proliferation of the interstitial tissue, which would increase the hormone output of the gland. The operation was not followed by the expected results, as the interstitial cells of the testes have never been proved to be the source of the testicular hormone. Even in cryptorchidism, in which the undescended testicle has no function as a gland of external secretion, there is no evidence of enhanced internal secretion—rather the reverse.

In 1927, McGee, following a series of other painstaking investigators, succeeded in preparing an extract of bull testes, which was active in causing growth of the comb of castrated cocks. The two tools, method of extraction and of assay, were now available, which, used together and in conjunction with the powerful weapon of modern organic chemistry, cleared the way for a rapid advance and widening of knowledge of the physiology of the testicular hormone.

Following upon the work of McGee, the purification of extracts of testes proceeded rapidly to the stage when the active principle of the extract was isolated and its chemical structure defined. In 1931, Butenandt isolated from human male urine two substances which had the biological properties of the male hormone. These substances were chemically identified and named androsterone and dehydro-androsterone. Shortly afterwards they were prepared synthetically. In 1935, Laqueur purified the hormone of testicular extract and showed that it differed only slightly in chemical composition from the substances found in male urine. This hormone, which he named testosterone, can also be prepared synthetically.

Three tests are used to identify androgens. The first employs the ability of such substances to restore the comb of the castrated cock. The second, which is a more sensitive test for testosterone, depends upon the power of this hormone to cause development of the seminal vesicles of castrated rats. The third test is a colour reaction—the Zimmerman reaction. This test is not specific for androgens but is given by other non-androgenic substances which have approximately the same chemical structure, so that values obtained by this method are in general higher than those given by biological tests.

THE NATURE OF ANDROGENS

The substances found in male tissues and excretions which have the properties of reversing the effects of castration are classified together under the general term of androgens, just as their counterparts in the female are termed œstrogens.

CHEMISTRY.—The intimate functional relationship which exists between androgens and œstrogens is not surprising if the close chemical relationship of these substances is considered. Both have the same fundamental molecular structure based on the cyclopentenophenanthrene molecule (fig. 1).

This basic structure is capable of many modifications. By varying the saturation of carbon atoms in the ring and by the addition of side chains, an enormous number of closely related substances can be produced; and to these the term steroid is applied.

Whilst the chemical relationship of the steroids is
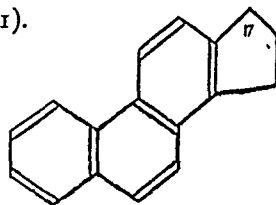
FIG. 1.

se, their biological activity is varied; and, as organic chemistry has advanced to bare the secrets of hitherto mysterious substances, it has been found that the roids play an impressive and versatile rôle in biology. Thus it is interesting to te that to the steroid group belong such functionally unrelated substances as olesterol, the active principles of the digitalis group of glucosides, the vitamins the D group, the cortical adrenal, the ovarian, and the testicular hormones, d the carcinogenic hydrocarbons.

TESTOSTERONE

CORTICOSTERONE

ANDROSTERONE   DEHYDROISOANDROSTERONE

FIG. 2.

Testosterone has the formula shown in fig. 2; it is the main if not the only hormone of the gland, but it is not yet certain that the testicle is the only source of testosterone. About thirty-seven different androgenic steroids are known; most have been prepared synthetically and several are found in human urine. The urinary androgens which are derived from testosterone and which occur in greatest abundance, are androsterone and dehydroandrosterone; isoandrosterone and etiocholanoline are present in much smaller quantities.

17-ketosteroids.—The formula for these substances is shown in fig. 1 and it will be noted that all are closely related and have an atom of oxygen at carbon atom 17. Substances having this chemical characteristic are known under the collective term of 17-ketosteroids. From experimental studies on the excretion of the 17-ketosteroids, following on the administration of testosterone, it is apparent that these substances represent the metabolic products of testosterone metabolism. This latter hormone is the true internal secretion of the testicle, as it enters the blood stream and is modified in the course of metabolism and excretion to produce the 17-ketosteroids.

The steroids of the suprarenal cortex bear a close chemical relationship to the androgens (fig. 2) and it can be shown that the administration of corticosterone leads to an enhanced excretion of the 17-ketosteroids. This fact provides an explanation for the anomalous findings that the urine of women and male castrates contains the same ketosteroids as normal males but in smaller quantities (table 1).

TABLE I

THE AMOUNT OF ANDROGENS OCCURRING IN URINE FROM DIFFERENT SOURCES

Source	Mgm. Androgen excreted in 24 hours expressed as Androsterone
Men	3—10
Women	3—10
Boys under puberty: $6\frac{1}{2}$ to 10 years	0·07—0·2
Girls : 8 to 10 years	0·18—0·2
Eunuchoids	1·5—4

(Modified from Koch, 1942)

That the elaboration of testosterone is not an essential prerequisite for the excretion of 17-ketosteroids is shown by the results of examination of the urine in cases of adenoma, neoplastic tumours, and hyperplasias of the adrenal cortex. Such conditions may give rise to the syndromes of precocious puberty, virilism, or the Cushing syndrome, and are often associated with greatly increased urinary excretion of the 17-ketosteroids; from 100 to 200 mgm. of androgen may be excreted by such patients in twenty-four hours. In other cases, in which there is no quantitative increase, abnormal members of the series may appear in the urine. The origin of the urinary androgens from the suprarenal cortex in these abnormal circumstances is clearly shown by the fall in androgenic excretion which invariably follows surgical removal of the neoplasm. In Addison's disease in women, in which it is reasonable to suppose that the production of cortical hormone is much decreased, urinary androgen estimation gives low values. In hirsutism in women, androgenic secretion is occasionally, but not invariably, enhanced.

THERAPEUTIC PREPARATIONS OF TESTOSTERONE

Testosterone is believed to be the natural hormone of the testes; it is ten times as potent as androsterone in promoting the growth of the comb in capons, and seventy times as potent as androsterone in its action on the seminal vesicles of castrate rats. It is therefore the substance of choice for therapeutic purposes. Testosterone in the pure state is, however, transient in its action, but it has been found that this can be prolonged and increased by combining it with propionic acid to form the ester, testosterone propionate.

Testosterone propionate when given by mouth is rapidly absorbed but it is also quickly excreted, so that its action is somewhat transient; it is therefore generally administered by intramuscular injection in the form of a solution in a vegetable oil. In this way a more gradual absorption is obtained, which resembles more closely the continuous secretory behaviour of the natural gland.

Subcutaneous implantation.—This object can be further advanced by the use of tablets of compressed crystalline steroid which are prepared for implantation into the subcutaneous tissue. By this means, a depot is formed in the tissues, from which the hormone is slowly mobilized into the blood stream. Such tablets are generally prepared in weights of 50 to 100 mgm.

Methyl testosterone.—Recently, the methyl derivative of testosterone has been introduced, and this substance has the advantage that it is excreted more slowly than testosterone propionate and is said to be suitable for oral administration (Spence, 1942). It is given in doses of 15 to 100 mgm. It is likely that the maximum effect is obtained if the drug is absorbed from the sub-lingual mucosa, as in this way it is said to avoid the destructive action of the liver.

PHYSIOLOGICAL FUNCTIONS

Action in utero.—The influence of the testicular hormone on physical characteristics is important, even during intra-uterine life. It is probable that the secondary sex characters shown by the infant at birth are due to the action of endogenous testosterone elaborated by the fœtal testes under the influence of the mother's anterior pituitary gland. Experimentally, it can be shown that the treatment of pregnant animals with androgenic substances induces intersexuality in the female off-spring

ntchakoff, 1936). The phenomenon of the freemartin twin, frequently seen
sheep and cattle, is due to the influence of the testicular secretion of the male
n on the female partner *in utero*. In the testes of fœtal animals, the male sex
mone can be demonstrated, but disappears after birth, and testicular activity
ains in abeyance until puberty, when the testicle begins to secrete its hormone
in and continues as an active endocrine gland into old age.

During adult life, the importance of the male sex hormone can be studied in
) ways:—(1) By observing the effects of castration on physical development and
tabolism before and after puberty, and (2) by observing the effects which follow
: administration of active androgens on such castrates.

THE EFFECTS OF CASTRATION

e-pubertal castration.—In man, castration before puberty leads to the development
a well-recognized condition. Whilst growth of the skeleton as a whole is much
arded, the epiphyses of the long bones fail to close at the normal time and the
ntinuing growth leads to a disproportionate lengthening of the limbs. Muscular
velopment is poor and the subcutaneous fat assumes a feminine type of distribu-
n. The voice remains high in pitch and feminine in quality. The external
nitalia fail to develop and the hair over the body is sparse, soft, and has not the
ual masculine distribution.

Post-pubertal castration.—The picture resulting from castration after puberty is
ss clearly defined than that just described. The regressive changes develop
adually, and their intensity may to some extent depend upon the age at which
e individual loses his testicular hormone. There is a generalized loss of hair
ver the surface of the body; in particular, the beard becomes sparse and the hair
ne and soft. Elevation in the pitch of the voice develops so gradually that the
nnormality is often noticed only when the normal masculine timbre is restored
y the institution of replacement therapy. Muscular atrophy gives rise to weakness
nd flabbiness of the muscles and the patient is conscious of a loss of staying power
nd is easily fatigued. This muscular change, together with a variable degree of
besity, in which the fat tends to be deposited on the buttocks and chest, combines
) give the body a feminine appearance. This impression is accentuated by a pallid
ppearance of the skin, which loses its pigment and fails to tan under the sun;
t is smooth and, on account of the increase in subcutaneous fat, tends to lose its
:reases. Along with these general changes there is a variable degree of genital
ttrophy, never of the extreme degree seen in the pre-pubertal castrate but sufficient
:o be remarked, especially as it is accompanied by loss of libido and sexual power.
Edward, Hamilton and Duntley (1939) found that hypotension frequently occurs in
:astrates and they attribute the pallor of the skin to a reduction in peripheral blood
low. These circulatory changes may be, in some way, related to the vasomotor
nstability expressed in transient vasodilatation and flushing, such as is usually
expected about the time of the menopause in women, but is also seen shortly after
removal of the testes in the male. This symptom is also occasionally a complaint
of men after middle-age and gives some basis for the belief that a hormonal upset
occurs in the male analogous to, but less dramatic than, the climacteric in women.
Observations in man of the effects of replacement therapy with testosterone are

as yet scarce, but it seems clear that such treatment induces growth in he[ig]? so that the adolescent spurt in growth in boys is, at least in part, due to t[h]? secretion of testicular hormone. In boys before puberty the administration [of] testosterone may induce some degree of priapism (Hamilton, 1937). In eunuch[oid]? and castrates the continued administration of the hormone induces growth of t[h]? sexual organs, and at least partial return of some of the secondary sex character? With these effects are associated a return of vivacity and a feeling of well-being.

Studies of the metabolism of eunuchoids under the influence of exogen[ous]. testosterone have been carried out by Kenyon (1942). The metabolic chang? reflect the changes in physical characteristics; basal metabolism and heat produ[c]? tion are increased; retention of nitrogen, creatine, and inorganic phosphates [a]? sulphates, indicates an anabolic process and represents the building of muscle [a]? other tissue. Retention of sodium, potassium, chloride, and water, probably res[ult]? from an action on the renal tubule, similar to that of the adrenal steroids, and ag? this emphasizes the close relationship between the adrenal and testicular hormo[ne]?

In certain cases of *cryptorchidism*, testosterone will cause descent of the te[st]? and it has been suggested that when gonadotropic substances are used to produ[ce]? this effect they really act indirectly by stimulating the testicle to produce te[sto]? sterone. It is this latter hormone which is the active agent in bringing the testi[cle]? into the scrotum.

Effect on spermatogenesis.—It is well established that both ovarian and testicu[lar]? activity are controlled by a hormone of the anterior pituitary gland, and it is kno[wn]? that the activity of this gland may be depressed by the administration of exogen[ous]? œstradiol or testosterone, so that the administration of the testicular hormo[ne]? although it brings about all the somatic changes normally produced by the testi[cle]? may depress spermatogenesis by virtue of its effect in stopping the production [of]? anterior pituitary hormone. This action clearly sets a limit to the therapeutic v[alue]? of the testicular hormone in males.

Effects on the female.—The administration of testosterone to women, by inhibiti[ng]? the secretion of gonadotropic hormone by the anterior pituitary gland, robs [the]? ovary of its stimulation and thus prevents ovulation and œstradiol producti[on]? The resulting effect is to suppress menstruation while the uterine endometr[ium]? remains in the interval or resting phase.

THE THERAPEUTIC USES OF TESTOSTERONE

The increase in knowledge of the biology of endocrine glands, which has ta[ken]? place in the past twenty-five years, has given new tools to the therapist and h[as]? raised expectations which have, unfortunately, not been fully realized. With e[ach]? advance in endocrinology, a new hormone or preparation has been launched w[ith]? high hopes, only to be dashed on the rocks of practical testing. In general, horm[one]? therapy is replacement therapy and, since its aim is to simulate the consta[nt]? secretory behaviour of the natural gland, it is necessary, in order to maintain [its]? effect, to continue administration indefinitely. Whilst the action of exogen[ous]? hormones is thus transitory, it should be remembered that they are highly pote[nt]? substances, capable in some instances of doing irreparable damage. So comp[lex]? are the interactions of the endocrine system, and so incomplete is present kn[ow]? ledge, that it is not surprising if unexpected effects are sometimes seen. The [u]?

he newer hormones must, for a time, be regarded as something of a therapeutic
enture, and the complexity of the problem may be demonstrated by considering
 questions which arise during the treatment of delayed puberty, or threatened
uchoidism, with testosterone.

The main difficulty lies in deciding at what point to institute androgenic treat-
nt, as it is not easy to say that any given case will not develop spontaneously in
 normal manner with the passage of time. On the other hand, the administration
estosterone is undoubtedly most effective in bringing about development of the
ondary sex characters when it is given at or about the normal time of puberty,
en the tissues are likely to be most sensitive to its action. If treatment is long
ayed, the masculinizing effects, although considerable, are less striking and more
ficult to maintain. At the same time, too, it must be borne in mind that testo-
rone inhibits the elaboration of gonadotropic hormone and, in this way, may
event the testicle from fully developing its function. For the same reason,
tosterone inhibits spermatogenesis, so that, whilst the general physical abnormal-
es of the eunuchoid state are corrected, reproductive capacity is not improved
t, if anything, is lessened.

In *delayed puberty* endocrine treatment should be reserved for clear-cut and
vere cases and, in the first place, an attempt should be made to stimulate the
sticle to activity by the administration of an active gonadotropic preparation for
me three or four months. If this treatment fails, then the administration of
stosterone propionate may be begun by giving 15 to 50 mgm. in oily solution by
tramuscular injection on alternate days. Considerable modification of the dose
ay be necessary, according to the response obtained.

In *true eunuchoidism in adults* and in the pre- and post-pubertal castrate, testo-
erone therapy has a rational basis and may be employed with good expectations
f improvement. It is impossible to lay down hard and fast rules with regard to
osage, but the initial dose required is often about 100 to 200 mgm. of testosterone
ropionate per week—it may be more—and the administration must be continued
ntil a sufficient degree of improvement is obtained; thereafter, the quantity given
ay be reduced. To avoid the necessity for frequent injections, a compressed pellet
f crystalline testosterone may be implanted into the subcutaneous tissues, either
 the interscapular region or in the anterior abdominal wall. From these areas
o mgm. of testosterone are completely absorbed in about eight to ten weeks, but
bsorption obviously cannot be controlled, thus it is usually necessary to supple-
ent the subcutaneous dose, either by injections of testosterone propionate or by
ethyl testosterone by mouth.

Psychogenic impotence.—Androgenic substances have been extensively employed
 impotence due to psychological causes, with varying success. The value of any
reatment in this condition is most difficult to judge but, in assessing the chances of
mprovement from testosterone, it should be remembered that this substance does
ot act as an aphrodisiac and, further, in individuals with normal testicular secretion,
ndrogens do not improve sexual function.

Cryptorchidism.—Whilst it is true that descent of the testes is normally brought
bout by the testicular hormone, and that, when this event follows treatment with
onadotropic extracts, it is really *due to the influence of the androgen elaborated
nder the stimulus of the gonadotropin, it is doubtful if any advantage is t

obtained by using testosterone, and there is the constant risk of damaging sperma genesis. In any event, it is not unlikely that those cases of cryptorchidism wh respond to endocrine treatment are those in which spontaneous descent wo eventually occur.

Prostatic hypertrophy.—There is no scientific basis for the treatment of prosta enlargement with testosterone and, although it has been widely used for th purpose, the evidence of its efficacy is sufficiently conflicting to be disregarded.

Sterility in the male.—This is a condition with a multiplicity of causes, ofr difficult to identify, and it is not yet clear what part endocrine disturbances pl in its production. The defect is localized in the spermatogenic tubules and there so far, no evidence that testosterone has any direct influence on this tissue. Oth endocrine glands are probably of greater importance in the genesis of steril than the endocrine tissue of the testicle.

ANDROGEN THERAPY IN THE FEMALE

Recently, testosterone propionate has been used in the treatment of such gynæ logical disorders as dysmennorrhœa with menorrhagia, metropathia hæm rhagica, mastodynia, and uterine hæmorrhage from small uterine fibroids—con tions probably due to excessive production of œstrogens. Here, the use of androge is based upon their ability to inhibit the secretory activity of the anterior lobe the pituitary gland and to antagonize œstradiol in its peripheral actions. It certainly true that testosterone inhibits ovulation, with consequent suppression menstruation, but the use of this substance in gynæcology has not yet passed t experimental stage. The dosage remains in doubt and is probably variable fr case to case: 100 to 150 mgm. weekly is an average dose for the suppression menstruation. With such doses, especially if continued, there is a risk of induci a significant degree of virilism, manifested by a tendency to hirsutes and acne the face. During pregnancy, androgen administration is likely to do harm to t course of development of the fœtus and should not be used.

Undesirable side-actions.—Side-actions which may be seen during the use testosterone in the male are priapism (which may be frequent and necessit reduction of the dose), excessive genital growth, and acne of the face. These effe are mostly seen when testosterone is used about the age of puberty. In other c there may occur a rather rapid gain in weight, with some degree of œdema, a result of the effects on electrolyte and fluid balance. As the use of the horm is more fully recorded, other ill-effects may doubtless appear: it would not surprising if the enthusiastic administration of testosterone induced some deg of hypertension, such as follows the use of corticosterone.

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HE MATERIA MEDICA OF ENDOCRINOLOGY

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INTRODUCTION

E transfer of the results of research in endocrinology from the research atory and clinic to the surgery of the general practitioner has been retarded 1ore than the intrinsic difficulty of the subject. Even those with profound retical knowledge have been handicapped in practice by the unreliability of y glandular preparations and by the complexity of their nomenclature. Others obtained bad results by the incorrect prescription of good remedies.

is unfortunate that there is no way of hall-marking preparations of proven e. The valueless preparations which flooded the market before the war and :ommon even now, when men and factories might be put to better use, are of kinds:—those manufactured by firms of low integrity who care little whether r products work so long as they sell, and those made by famous and reputable s (which are, after all, commercial and not philanthropic organizations) iuse the demand for them by medical practitioners continues. It is clear that medical profession has a serious responsibility in respect of this latter group, it would be better for all concerned if prescriptions were restricted to prepara- 1s for which scientific evidence has proved the value both of the particular istance used and of the route by which it is given. In this article, so far as sible, this has been the criterion used in selection. Clearly, however, one ysician is unlikely to have had the opportunity of testing every glandular paration available and there are undoubtedly some good ones which are itted.

ncorrect prescribing is common, largely because treatment in endocrine disease 1ever symptomatic. An exact diagnosis and a knowledge of the physiology of ernal secretion should precede prescription. I have more than once been asked question "Is it true that stilbœstrol is good for amenorrhœa?" by practitioners o would never have asked "Is cascara good for the belly-ache?" Those who- *r*e tried to cure with stilbœstrol the amenorrhœa due to an excessive secretion œstrogen are often discouraged from using it for patients who need it. An added irce of error in medical gynæcology comes from the cyclical nature of female ysiology. A drug administered with a certain effect in the early part of the inter- 'nstruum may have a quite different effect in the premenstrual phase.

The *route* of administration remains, perhaps, the most common source of error. cannot be too strongly stressed that of the true glandular extracts (as opposed a small number of synthetic preparations) only one, that of the thyroid, is active en swallowed. The numerous expensive pills and tablets of thyroid combined :h pituitary, gonadal and other tissue extracts, are active in virtue of their- roid alone. Apart from injection and swallowing, two other methods of adminis- tion are available: buccal absorption and inunction. The former, achieved by- arking" the prescribed drug *in the sulcus* conveniently provided between the-

dyspnœic, wheezy and coughing. The cough was at first dry and later be-- loose. Owing to the demented state of the patients the sputum was not usu: expectorated but was swallowed, causing vomiting in some cases. In the mild: cases the temperature did not rise above 99° F.; in those more seriously aff— it rose to 101° to 103°:F., but the pulse and respirations rose considerably, ev— those with little or no pyrexia. On palpation, tactile fremitus was sometimes fou: The breath sounds were often difficult to hear owing to the shallow breathing, psychotic patients. In the severer cases there were often diffuse, coarse, ...'" râles in both lungs. Thick, evil-smelling, greenish-yellow sputum was . ..: expectorated in the later stages and was collected from seven patients. On cul: it gave a heavy growth of *Streptococcus pneumoniæ* (i.e. pneumococcus). F. patients developed broncho-pneumonia. Other complications were one case -- of otitis media and herpes zoster.

TREATMENT AND PRECAUTIONARY MEASURES

It was soon evident that an epidemic had begun, and the following p .. .... measures were taken. The patients were isolated, and the position of every ' bed was reversed, so that alternate patients slept with their feet to the wall, and nurses donned gowns and masks. In the milder cases treatment consisted ' administration of salicylates and the usual cough medicines. Usually the temp- ature became normal in about a week and the patients were well again at the of another two weeks. Sulphapyridine was given to severely ill patients. ' drug showed its specific value in the treatment of pneumococcal infections. striking way. In all five cases in which it was given the temperature · ', dramatically within twenty-four hours and remained normal. The dosag: sulphapyridine adopted was 2 gm. immediately and then 1 gm. four-hourly. i.' decreased after twenty-four hours and in no case exceeded 20 gm. in five w.. Although at one time the epidemic appeared to be serious, it subsided without deaths.

CONCLUSION

It is interesting to note that at about the same time children living on the estate suffered from various pyogenic complaints of the ear, nose and throat, in the only two cases that it was possible to investigate bacteriol— . *Streptococcus pneumoniæ* was grown.

The epidemic, which is of a type, so far as I am aware, not previously kr is a reminder (1) that bronchitis is infective (2), that the danger of cross '' is ever present in hospital wards and, for that matter, wherever people are . together.

VITAMIN DOSAGE

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THE vitamins have three main spheres of action:—

First, the sphere of protection or *prevention*. Their presence in sufficient quantity in the diet is necessary for normal growth and development, and for maintenance of health and function.

Secondly, the sphere of *treatment*. They are effective in the treatment of fully developed deficiency diseases, such as rickets and scurvy, and of symptoms caused by vitamin shortage.

Thirdly, they are of use in the *auxiliary treatment* of other conditions not primarily due to vitamin deficiencies. For example, vitamin C is often prescribed in the acute fevers; vitamin B_1 is prescribed in many diseases of the central nervous system, and nicotinamide is a useful adjunct to sulphanilamide therapy.

The dose varies according to the purpose for which the vitamin is ordered.

In the first sphere, that of prevention or protection, a generous diet, including ample supplies of dairy produce, fresh vegetables and wholemeal bread, should contain all the vitamins necessary for the normal child and adult, with the exception of vitamin D, which is poorly represented in foodstuffs.

In the second sphere, when symptoms of deficiency of any one of the vitamins are developed, a generous diet should (if possible) be given, and extra amounts of the vitamin which is deficient should be ordered, either as a foodstuff or as a commercial preparation.

It is in the sphere of *auxiliary treatment* that the commercial preparations are so useful, as accurate doses can be given, and larger amounts administered, than would be feasible if natural products were relied on.

It is now possible, by the simple manœuvre of reading the label on the bottle or packet, to discover the strength of all products sold for their vitamin content. All vitamin preparations classified as *medicines* must be labelled to comply with the Pharmacy and Medicines Act of 1941; that is to say, the label must state the B.P. or B.P.C. name (or other accepted scientific name) of the active ingredients, together with the quantity present. In addition, the "Labelling of Food Order (1944)" ensures that the amounts of vitamins in preparations classified as *foods* must be clearly stated.

When a vitamin preparation is prescribed, it is necessary to keep clearly in mind for what purpose it is to be given. Is it to prevent or to cure deficiency symptoms, or is it to act as an auxiliary form of treatment? In addition, if a preparation containing more than one vitamin is used, it is important to ensure that the vitamin for which the product is prescribed is present in sufficient quantity. A few examples will make this clear:—

Oil and malt.—This popular mixture supplies vitamins A, D, and the B complex. Most of the cod-liver oil and malt preparations on the market contain 15 per cent. of cod-liver oil, yet two teaspoons are often substituted willy-nilly for two teaspoons of cod-liver oil, thereby reducing the number of international

units of vitamin D taken daily by the child from 800 to 120. Thus, most ∵il. malt preparations are unsuitable either for the prevention or for the ·· ·m. of rickets.

(2) *Halibut oil.*—If this product is administered in the dose often ∵uppe∵t' namely three drops daily, the requirements of vitamin A are more than cover∵! but the amount of vitamin D falls far short of the requirement for the preven∵ of rickets in the infant, for three drops of halibut oil contain only 220 unit∵. ∵ vitamin D. This amount is not enough to prevent the major and minor manife∵ tions of rickets; yet three drops of halibut oil are often substituted for two t∵ spoons of cod-liver oil, with the idea of preventing rickets in children ∵. ∵∵ are said not to tolerate cod-liver oil well.

The following tables show the strengths of different products in terms of ∵n∵ national Units and milligrammes; the amounts of vitamin contained in 1 · ·· 1 teaspoonful, 1 c.cm., 1 gm., and 1 minim are given. In addition, there i∵ ∵ column which shows how much of the product contains the amount of the ∵it∵ needed daily to prevent deficiency. It is not suggested for one moment that ∵ ∵ amount should be administered, because all additions of vitamins (with the ex∵ tion of vitamin D, as previously stated) are supplementary to diet. The ∵o' is added for purposes of comparison of strengths of different products and, in · ∵ case of mixtures, to show the balance of the amounts of the vitamins present.

The values given in the tables were obtained in the first instance from ∵∵ facturers' figures, as printed on the label or given in catalogues. The amount∵ vitamin present were sometimes stated on the label in International Units, times in milligrammes, and the number of units or milligrammes which ∵ ·∵∵ contained in one ounce (by weight or volume), one gramme, one cubic · ∵∵ sixty minims (one drachm*), one teaspoon, one minim, or one drop. In the ∵∵ an attempt has been made to reduce all this information to common terms. ∵ has involved a good deal of calculation and, to avoid too many fractions splitting up of minims, the number of minims, teaspoons and so on, neare∵ value to the calculated figure has been listed (see note on table 6).

It is instructive to work out the cost of the preparations in terms of the ∵ need.

In the tables the vitamins dealt with are A, B_1, B_2, nicotinic acid, C, and ∵ No attempt has been made to deal with other members of the vitamin B comp∵ vitamin E, vitamin K or vitamin P.

SUGGESTED DAILY REQUIREMENTS OF THE VITAMINS

Vitamin A	.. .. ..	4,000 units
Vitamin B_1	.. .. ..	500 ,, or 1·5 mgm.
Vitamin B_2	.. .. ..	1,000 ,, or 2·5 mgm.
Nicotinic acid	.. ..	Figures varying from 30 mgm. to 350 ∵ have been suggested.
Vitamin C { child	.. ..	1,000 units or 50 mgm.
⎩ infant	.. ..	200 to 600 units or 10 to 30 mgm.
Vitamin D { child ⎫ ⎩ infant ⎭	.. ..	750 units.

* The drachm is no longer "official" in the British Pharmacopœia.

NOMENCLATURE OF VITAMINS AND VALUE OF UNITS IN MILLIGRAMMES

amin A: Axerophthol

    1,000 International Units   ..   0·33 mgm. crystalline vitamin A

    3,000   ,,   ,,   ..   1·0   ,,   ,,   ,,

    1,000   ,,   ,,   20,000 units b-carotene

amin B_1: Aneurine hydrochloride, thiamine hydrochloride, torulin

    1,000 International Units   ..   3·0 mgm.

    ,333   ,,   ,,   ..   1·0   ,,

amin B_2: Riboflavin, lactoflavin, vitamin G

    No International Unit

    1,000 Sherman units   ..   ..   2·5 mgm.

    400   ,, ...   1·0   ,,

cotinic acid, nicotinamide, niacin, niacinamide, P.P. factor

    No International Unit; measured in milligrammes

tamin C, ascorbic acid, cevitamic acid

    1,000 International Units   ..   50 mgm.

    20   ,,   ,,   ..   1   ,,

itamin D, calciferol, irradiated ergosterol

    1,000 International Units   ..   0·025 mgm. calciferol

    40,000   ,,   ,,   ..   1·0   ,,   ,,

TABLE OF MEASURES

he following values were accepted in working out unit content of the prepara-
tions:—

1 ounce (by volume)	28·4 c.cm.
1 cubic centimetre	17 minims
1 minim	2 drops

    (The number of drops in a minim depends on bore of dropper and surface tension of fluid. In the preparations of the oily concentrates measured, two drops were found to equal one minim)

1 fluid drachm (60 minims: see footnote on p. 164)	3·5 c.cm.

    (Some of the manufacturers use the terms teaspoon and drachm synonymously. Whenever the value in units is given by the manufacturer in fluid drachms, the drachm is taken to mean 3·5 c.cm.)

1 teaspoon	5·0 c.cm.
1 c.cm.	1·0 gramme

    (For practical purposes, when oily products are under consideration)

1 c.cm. malt extract	1·4 grammes

TABLE I: TABLETS, CAPSULES AND AMPOULES CONTAINING VITAMIN A ONLY

me of these preparations could be used in the sphere of prevention; the whole the day's need could be supplied by taking one capsule of avoleum, metabevan, vitapex, or a tablet of carotene tabloid. By taking one tablet of essogen, a useful *plement* to the vitamin A in the day's food could be supplied. The other ducts are of higher potency; there are several ampoules containing solutions be given hypodermically; obviously these are for use in therapy and not for vention of disease and the maintenance of health.

TABLE 1

Name	Description	I.U. in one tablet, capsule, or ampoule	Daily need (4,000 I.U.) contained in tablet, capsule or ampoule	Made by
Alphalin	capsules	10,000	⅖ cap.	Lilly
Avoleum	,,	4,500	1 ,,	British Drug Houses
Carotene tabloid ..	tablets	4,500	1 tab.	Burroughs Wellcome
Davitamon A ..	ampoules	60,000	1/15 amp.	Organon
Essogen	capsules	2,000	2 cap.	Lever
Metabevan	,,	4,500	1 ,,	Evans
Prepalin	,,	24,000	⅙ ,,	Glaxo
Prepalin	ampoules	100,000	1/25 amp.	,,
Vitamin A	capsules	33,000	⅛ cap.	Crookes
Vitamin A	ampoules	100,000	1/25 amp.	,,
Vitapex	capsules	4,500	1 cap.	Paines and Byrne
Vitapex	ampoules	75,000	1/20 amp.	,,

The daily need of vitamin A = 4,000 International Units.

TABLE 2: FLUID PREPARATIONS CONTAINING VITAMIN A ONLY OR GIVEN FOR THEIR VITAMIN A CONTENT

These products, with the exception of the carotene oils, are concentrates of vitamin A of high potency; note that the amount containing the daily need is given in minims or fractions of a minim. The two fish-liver oils contain vitamin D in addition to vitamin A.

The use of these products is in the sphere of treatment of vitamin A deficiencies.

TABLE 2

Name	I.U. contained in 1 minim	I.U. contained in 1 teaspoon	I.U. contained in 1 ounce	I.U. contained in 1 gramme	I.U. contained in 1 c.cm.	Daily need (4,000 I.U.) contained in	Made by
Avoleum ..	1,717	150,000	852,000	30,000	30,000	2½ minims	British Drug Houses
Carotene oil (1)	188	15,975	90,738	3,195	3,195	1·25 c.cm.	Napp
Carotene oil (2)	70	6,050	34,364	1,210	1,210	4 c.cm.	,,
Fish-liver oil	11,760	1,000,000	5,680,000	200,000	200,000	⅓ minim	,,
Halibut-liver oil (B.P.C.)	1,717	150,000	852,000	30,000	30,000	2½ minims	B.P.C.
Liquid vit. A (conc.) ..	2,940	250,000	1,420,000	50,000	50,000	1⅓ minims	B.P. Glaxo
Prepalin ..	4,235	360,000	2,044,800	72,000	72,000	1 minim	Glaxo

TABLE 3: TABLETS, CAPSULES AND AMPOULES CONTAINING VITAMIN D AS THE ONLY VITAMIN

There are several products, in which one tablet supplies about two-thirds of a day's need; these could be used to supplement the vitamin in the diet. Calcium and other minerals are added to several of the preparations. There are some ampoules containing products of high potency for injection. In practice, none of these products would be prescribed to supply daily need; they would be of use in the field of therapy, when extra vitamin D was considered necessary to aid in the absorption of calcium.

TABLE 3

Name	Description	I.U. contained in 1 tablet capsule or ampoule	Daily need (750 I.U.) contained in	Made by
Calciferol	tablets	4,000	¼ tab.	Burroughs Wellcome
"	"	10,000	1/13 "	"
Calcydic	"	500*	1½ "	Allen and Hanburys
Calcium with vitamin D	capsules	250*	3 cap.	Crookes
Calfo-Rayol ..	tablets	660*	1¼ tab.	Squibb
Calsolact D	"	1,000*	¾ "	Allen and Hanburys
Davitamon Forte	ampoules	12,500	3/50 amp.	Organon
Davitamon D (Superforte)		300,000	1/400 "	"
Decufer	tablets	500*	1½ tab.	"
Ostelin ..	"	500	1½ "	Glaxo
Ostelin H.P.	"	50,000	3/200 "	"
Ostocalcium	"	500§	1½ "	"
Radiostol ..	pellets	3,000	¼ pell.	British Drug Houses
Tab. Calciferol Co. ..	tablets	500	1½ tab.	B.P.
Vitamin D (Pabyrn) ..	"	2,000	⅜ "	Paines and Byrne
Vitamin D "	ampoules	15,000	1/20 amp.	"

* Plus minerals. § Plus calcium.

Daily need of vitamin D = 750 International Units.

TABLE 4: FLUID PREPARATIONS CONTAINING VITAMIN D ONLY

These preparations vary greatly in strength; this is evident if the column headed "daily need" be examined. In the strongest preparation the daily need could be obtained by taking only 1/20 of a minim; in the weakest one, two teaspoons daily would be required.

These products are rarely used for prevention; usually a preparation containing both vitamin A and D is prescribed for this purpose.

TABLE 4

Name	I.U. in 1 minim	I.U. in 1 teaspoon	I.U. in 1 ounce	I.U. in 1 gramme	I.U. in 1 c.cm.	Daily Need (750 I.U.) in	Made by
Calciferol ..	177	15,000	85,200	3,000	3,000	4 minims*	Burroughs Wellcome
Calcydic ..	25	2,150	12,200	430	430	1.75 c.cm. ⅓ teaspoon	Allen and Hanburys
Calciferol (Liq. B.P.) ..	177	15,000	852,000	3,000	3,000	4 minims	B.P.
Calcium with vit. D	4	350	1,988	70	70	10 c.cm. 2 teaspoons	Crookes
Davitamon D	294	25,000	142,000	5,000	5,000	2½ minims	Organon
Davitamon D (forte)	735	62,500	355,000	12,500	12,500	1 minim	"
Davitamon D (super forte)	17,647	1,500,000	8,520,000	300,000	300,000	1/20 "	"
Liq. vitamin D conc. (B.P.)	588	50,000	284,000	10,000	10,000	1¼ "	B.P.
Ostelin emulsion	6	500	28,400	100	100	7.5 c.cm. 1½ teaspoons	Glaxo
Ostelin ..	294	25,000	142,000	5,000	5,000	2½ minims	"
Radiostol ..	177	15,000	852,000	3,000	3,000	4 "	British Drug Houses
Radiostol	6,000	500,000	28,400,000	100,000	100,000	⅛ "	"
Radiostol	12,000	1,000,000	56,800,000	200,000	200,000	1/16 "	"
Radiosterol	885	75,000	426,000	15,000	15,000	1 "	Allen and Hanburys

* See note in introduction about drops and minims.

When using a product in which the dose is given in minims, it is important to know how many drops the manufacturer's dropper delivers to the minim. The size of a drop depends on the surface tension of the fluid in question and the bore of the dropper. In most of the products two drops are equivalent to one minim, but this point should be checked by reference to the manufacturers.

TABLE 5: TABLETS, CAPSULES, AND AMPOULES CONTAINING VITAMINS A AND D

If this table be examined, it will be seen that some of the tablets, capsules and ampoules contain less than the day's need of vitamin D and more than the day's need of vitamin A; these products are not suitable for use as protective measures. For this purpose, a tablet, capsule or ampoule should be chosen which contains the daily need of vitamin D (750 units), and a good proportion of the daily need of vitamin A (4,000 units), as vitamin D is much less widely distributed in ordinary food than is vitamin A.

There are two ampoules containing high potency products for injection.

TABLE 5

Name	Description	A I.U. contained in 1 tablet etc.	D I.U. contained in 1 tablet etc.	Daily need		Made by
				A (4,000 I.U.) in	D (750 I.U.) in	
Adexolin	capsules	4,500	900	1 cap.	⅚ cap.	Glaxo
Advita	,,	2,000	200	2 ,,	3¾ ,,	Lever
Davitamon ..	,,	3,000	2,000	1⅓ ,,	⅜ ,,	Organon
,, A and D	comfits	1,500	1,000	2⅔ comf.	¾ comf.	,,
Dekadexolin ..	ampoules	60,000	10,000	1/15 amp.	3/40 amp.	Glaxo
Eubion	capsules	4,500	1,000	1 cap.	¾ cap.	Evans
Govt. tablets ..	tablets	4,000	800	1 tab.	1 tab.	Ministry Food
Halibol	capsules	4,500	900	1 cap.	⅚ cap.	Allen and Hanbury
Halibol calcium ..	,,	4,500	900	1 ,,	⅚ ,,	,,
Halibut-liver oil natural ..	,,	4,500	450	1 ,,	1¾ ,,	
Halibut-liver oil ..	,,	8,800	425	½ ,,	1¾ ,,	Crookes
,, ,,	,,	4,500	400	1 ,,	2 ,,	Boots
Halicalcyne ..	,,	5,330	1,063	⅘ ,,	¾ ,,	Crookes
Haliver oil ..	,,	4,500	450	1 ,,	1¾ ,,	Abbott
Hepicoleum ..	,,	4,500	1,000	1 ,,	¾ ,,	Lilly
Nadola	,,	4,500	450	1 ,,	1¾ ,,	Parke, Davis
Navitol	,,	9,400	1,700	½ ,,	½ ,,	Squibb
Oladol	,,	6,000	600	⅔ ,,	1¼ ,,	Abbott
Radiostoleum ..	,,	4,500	900	1 ,,	⅚ ,,	B.D.H
,, ..	ampoules	75,000	15,000	1/20 amp.	1/20 amp.	Squibb
Rayolex	tablets	3,300	660	1¼ tab.	1¼ tab.	Crookes
Super-D-oil ..	capsules	11,000	9,000	¼ cap.	1/12 cap.	Vitamins
Vitamins A and D..	,,	4,500	1,000	1 ,,	¾ ,,	Paines & Byrne
Vitapan	,,	4,500	1,000	1 ,,	¾ ,,	,,
,, compound	tablets	1,500	300	3 tab.	2½ tab.	,,
Vitamin A and D liquid	capsules	4,500	450	1 cap.	1¾ cap.	B.P. Co

Daily need of vitamin A = 4,000 International Units
Daily need of vitamin D =   750   ,,   ,,

TABLE 6: LIQUID PREPARATIONS CONTAINING VITAMINS A AND D

These products vary enormously in strength; the daily needs are contained in as little as a fraction of a minim in some cases, whereas in others as much as four teaspoons would have to be taken to supply the full amount. There are many familiar products here: the cod-liver oils, the halibut oils, and the preparations in which synthetic vitamin D is added to a concentrate of vitamin A.

TABLE 6

Name	Vitamin	I.U. in 1 minim	I.U. in 1 tsp. (5 c.cm.)	I.U. in 1 ounce	I.U. in 1 gm.	I.U. in 1 c.cm.	Daily need A (4,000 I.U.) D (750 I.U.) contained in	Made by
dexolin	A	705	60,000	340,800	12,000	12,000	6 minims	Glaxo
	D	117	10,000	56,800	2,000	2,000	6 ,,	
~ynol	A	17	1,500	8,520	300	300	13 c.cm. 2½ tsp.	Allen and
	D	2	200	1,136	40	40	19 ,, 4 ,,	Hanburys
cod-liver oil B.P.C.	A	35	3,000	17,040	600	600	7 ,, 1½ ,,	B.P. Codex
	D	5	425	2,414	85	85	9 ,, 2 ,,	
od-liver oil perfected	A	70	6,000	34,080	1,200	1,200	3·5 ,, ¾ ,,	Allen and
	D	9	760	4,260	150	150	5 ,, 1 ,,	Hanburys
od-liver oil Seven Seas H.P.	A	141	12,000	68,160	2,400	2,400	1·8 ,, ⅓ ,,	Brit. Cod-liver
	D	20	1,700	9,656	340	340	2·2 ,, ½ ,,	Oil Producers
od-liver oil compound	A	58	5,000	28,400	1,000	1,000	4 ,, 1 ,,	Ministry of
	D	12	1,000	5,680	200	200	4 ,, ¾ ,,	Food
od-liver oil reinforced	A	117	10,000	56,800	2,000	2,000	2 ,, ½ ,,	May and
	D	29	2,500	14,200	500	500	1·5 ,, 1-¼ ,,	Baker
avitamon A and D	A	353	30,000	170,400	6,000	6,000	12 minims	Organon
	D	294	25,000	142,000	5,000	5,000	2½ ,,	
alibol	A	2,353	200,000	1,136,000	40,000	40,000	2 ,,	Allen and
	D	382	32,500	184,600	6,500	6,500	2 ,,	Hanburys
alibut-liver oil, natural	A	2,353	200,000	1,136,000	40,000	40,000	2 ,,	,,
	D	176	15,000	85,200	3,000	3,000	4 ,,	
alibut L.O. (1)	A	1,764	150,000	852,000	30,000	30,000	2½ ,,	Napp
	D	117	10,000	56,800	2,000	2,000	6 ,,	
alibut L.O. (2)	A	5,882	500,000	2,840,000	100,000	100,000	1 ,,	,,
	D	176	15,000	85,200	3,000	3,000	4 ,,	
alibut-liver oil	A	1,764	150,000	852,000	30,000	30,000	2½ ,,	Boots
	D	147	12,500	71,000	2,500	2,500	5 ,,	
alibut oil	A	3,000	260,000	1,476,000	52,000	52,000	1½ ,,	Crookes
	D	147	12,500	71,000	2,500	2,500	5 ,,	
alidexol	A	90	7,700	43,736	1,540	1,540	2·5 c.cm. ½ tsp.	,,
	D	6	540	3,067	108	108	7 ,, 1½ ,,	
aliveroil	A	2,940	250,000	1,420,000	50,000	50,000	1½ minims	Abbott
	D	50	4,250	24,140	850	850	15 ,,	
aliverol	A	1,588	135,000	766,800	27,000	27,000	2½ ,,	Parke, Davis
	D	317	27,000	153,360	5,400	5,400	2½ ,,	
q. vit. A and D conc.	A	2,940	250,000	1,420,000	50,000	50,000	1½ ,,	B.P.
	D	294	25,000	142,000	5,000	5,000	2½ ,,	
adola	A	1,588	135,000	766,800	27,000	27,000	2½ ,,	Parke, Davis
	D	158	13,500	76,680	2,700	2,700	5 ,,	
avitol	A	3,235	275,000	1,562,000	55,000	55,000	1½ ,,	Squibbs
	D	588	50,000	284,000	10,000	10,000	1½ ,,	
adol	A	3,235	275,000	1,562,000	55,000	55,000	1½ ,,	Abbott
	D	323	27,500	156,200	5,500	5,500	2½ ,,	
vitamin	A	60	5,000	28,400	1,000	1,000	4 c.cm. 1 tsp.	B.P.
	D	6	500	2,840	100	100	7½ ,, 1½ ,,	
diostoleum	A	882	75,000	426,000	15,000	15,000	5 minims	British Drug
	D	176	15,000	852,000	3,000	3,000	4 ,,	Houses
per D	A	3,940	335,000	1,902,800	67,000	67,000	1 ,,	Crookes
	D	3,059	260,000	1,476,800	52,000	52,000	¼ ,,	

tsp. = teaspoons.

The remarks on balance of the two vitamins applies to this table as well as to the foregoing e (table 5); the remarks on size of drops (table 4) apply here also. It should be remembered

that the figures in these tables are calculated from the manufacturers' figures. When 'discrepancies appear to exist, it is because the calculation has been carried out to the nearest minim, or c.cm., as the case may be; also when the day's needs are given in c.cm. the *approximate number only* of teaspoons equivalent to the number of c.cm. is added.

TABLE 7: EMULSIONS CONTAINING VITAMINS A AND D

These preparations were widely used before the war; it was said that many children refused cod-liver oil but took the emulsion well. Often, then, two teaspoons of an emulsion were given daily, instead of two teaspoons of cod-liver oil. Some of the emulsions contained 50 per cent. cod-liver oil, some only 33 per cent., so that the unit content of the emulsion was at best only half that of the pure cod-liver oil.

It is remarkable that, since cod-liver oil has been widely publicized by the Ministry of Food, this preference of the children for emulsion seems to have diminished, and it is surmised that it may have existed only in the mind of the mother.

Emulsion ol. arachis is given in the B.P. Codex as Marylebone Cream (improved though whether the addition of peanut oil would improve the elegant preparation associated with the name of the late Dr. Eric Pritchard remains to be proved.

It should be noted that although Angiers' emulsion is often to be seen in the shop window of the chemist, paired off with Scott's or Grimsby emulsion on the vitamin shelf, it contains not a single vitamin. It is a cough medicine, with a base of liquid paraffin.

TABLE 7

Name	Vit-amin	I.U. in 1 minim	I.U. in 1 teaspoon	I.U. in 1 ounce	I.U. in 1 gm.	I.U. in 1 c.cm.	Daily need A(4,000 I U) D (750 I.U.) contained in	Made by
Crookes emulsion	A	33	2,850	16,188	570	570	1½ tsp.	Crookes
	D	3	285	1,618	57	57	2½ "	
Emulsion ol. morrh. B.P.	A	30	2,500	14,200	500	500	1½ "	B.P.
	D	3	250	1,420	50	50	3 "	
Emulsion ol. vitamin ..	A	30	2,500	14,200	500	500	1½ "	"
	D	3	250	1,420	50	50	3 "	
Emulsion ol. arachis ..	D	5	425	2,414	85	85	2 "	B.P. Cod.
Emuls. ol. morrh with glyc. phos.	A	30	2,500	14,200	500	500	1½ "	"
	D	3	250	1,420	50	50	3 "	
Emuls. ol. morrh with hypophosphates	A	30	2,500	14,200	500	500	1½ "	"
	D	3	250	1,420	50	50	3 "	
Emulsion of Cod-liver oil	A	32	2,750	15,620	550	550	1½ "	Boots
	D	2	200	1,136	40	40	3½ "	Fairbank
Grimsby emulsion ..	A	17	1,500	8,520	300	300	2½ "	Kirby
	D	2	212	1,207	42	42	3½ "	Scott and
Scott's emulsion ..	A	13	1,200	6,816	240	240	3½ "	Bowe
	D	2	180	965	34	34	4 "	

TABLE 8: TABLETS, CAPSULES, AND AMPOULES CONTAINING VITAMIN B₁ ONLY

With few exceptions, these are synthetic products. Their main use is for treatment of deficiencies, and as an adjunct in the treatment of other conditions.

TABLE 8

Name	Description	I.U.	Mgm.	Daily need (500 I.U.) contained in	Made by
Befortiss	ampoules	1,665*	5	½ amp.	Vitamins Ltd.
"	"	3,330	10	¼ "	"
"	"	8,325	25	1/15 "	"
Benerva	tablets	333	1	1½ tab.	Roche
"	"	1,000	3	½ "	"
"	ampoules	1,665*	5	⅓ amp.	"
Benerva forte	"	8,325	25	1/15 "	"
Berin	"	1,665	5	⅓ "	Glaxo
"	"	8,325	25	1/15 "	"
"	tablets	333	1	1½ tab.	"
"	"	1,000	3	½ "	"
Betebion	"	333	1	1½ "	Merck
"	ampoules	666	2	¾ amp.	"
"	"	3,330	10	¼ "	"
Betalin 1	capsules	125	0·4	4 cap.	Lilly
Betalin S	ampoules	333	1	1½ amp.	"
"	"	2,000	6	¼ "	"
"	"	3,330	10	¼ "	"
"	"	9,990	30	1/20 "	"
"	tablets	33	0·1	16 tab.	"
"	"	1,000	3	½ "	"
Betaxan	ampoules	1,665	5	⅓ amp.	Bayer
"	"	8,325	25	1/15 "	"
"	tablets	333	1	1½ tab.	"
"	"	1,000	3	½ "	"
Crysto-Vibex	ampoules	1,665	5	⅓ amp.	Parke, Davis
"	"	8,325	25	1/15 "	"
"	tablets	333	1	1½ tab.	"
"	"	1,000	3	½ "	"
Davitamon B₁	"	333	1	1½ "	Organon
"	ampoules	1,665	5	⅓ amp.	"
" forte	tablets	1,000	3	⅓ tab.	"
"	ampoules	8,325	25	1/15 amp.	"
Thiamine chloride	tablets	333	1	1½ tab.	Abbott
"	"	1,000	3	½ "	"
Vitamin B₁ hydrochloride	tabloid	1,665	5	⅓ "	Burroughs Wellcome
" "	"	8,325	25	1/15 "	"
" "	"	1,000	3	½ "	"
" "	"	1,665	5	⅓ "	"
" (Pabryn)	ampoules	1,665	5	⅓ amp.	Paines and Byrne
" "	"	8,325	25	1/15 "	"
" "	tablets	333	1	1½ tab.	"
" "	"	1,000	3	½ "	"
Vitamin B₁	ampoules	1,665	5	⅓ amp.	British Drug Houses
"	"	8,325	25	1/15 "	"
"	tablets	333	1	1½ tab.	"
"	"	1,000	3	½ "	"
"	ampoules	1,665	5	⅓ amp.	Crookes
"	"	8,325	25	1/15 "	"
"	tablets	333	1	1½ "	"
"	"	333	1	1½ tab.	"
"	"	1,000	3	½ "	"
"	ampoules	500	1·5	1 amp.	Allen and Hanburys
"	"	1,000	3	½ "	"
"	tablets	500	1·5	1 tab.	"
"	"	1,000	3	½ "	"

(* Approximate)

Daily need = 500 International Units.

TABLE 9: OTHER PREPARATIONS OF VITAMIN B₁

Here are four preparations of vitamin B_1. The tablets, capsules and ampoules in table 8 are more convenient forms than these elixirs, powder, and liquid.

TABLE 9

Name	Description	I.U. contained in 1 c.cm.	Mgm. contained in 1 c.cm.	I.U. contained in 1 gm.	Mgm. contained in 1 gm.	Daily need (500 I.U.) contained in	Made by
Betaxan ..	elixir	53	0·16			10 c.cm. (2 tsp.)	Bayer
Pulv. vit. B₁..	powder			100	0·3	5 gm.	B.P.
Ryzanin B ..	liquid	80	0·2			6 c.cm.	Burroughs Wellcome
Thiamine chloride ..	elixir	63	0·19			8 c.cm. (1½ tsp.)	Abbott

TABLE 10: TABLETS, CAPSULES AND AMPOULES CONTAINING VITAMIN B₂ (RIBOFLAVINE, VITAMIN G) ONLY

Riboflavine can be given by mouth or hypodermically; the list contains ampoules and tablets of two strengths.

TABLE 10

Name	Description	Sherman units contained in 1 tab., cap., or amp.	Mgm. contained in 1 tab., cap., or amp.	Daily need (2·5 mgm.) contained in	Made by
Lactoflavine ..	ampoules	400	1	2½ amp.	Roche
,, ..	,,	2,000	5	½ ,,	,,
,, ..	tablets	400	1	2½ tab.	,,
,, ..	,,	2,000	5	½ ,,	
Riboflavine ..	ampoules	400	1	2½ amp.	British Drug House
,, ..	tablets	400	1	2½ tab.	,,
,, ..	,,	400	1	2½ ,,	Burroughs Wellcome
,, ..	,,	2,000	5	½ ,,	,, ,,
,, ..	ampoules	400	1	2½ amp.	,, ,,
,, ..	tablets	400	1	2½ tab.	Crookes
,, ..	ampoules	400	1	2½ amp.	,,

TABLE 11: TABLETS AND AMPOULES CONTAINING NICOTINIC ACID (PP FACTOR) ONLY

These are of use in *treatment* of deficiencies; they are also of use as auxiliary agents, in the treatment of many other conditions.

TABLE 11

Name	Description	Mgm. Nicotinic acid contained in 1 tab or amp.	Made by
nvitamon P.P. .. .	tablets	50	Organon
cotinic acid	,,	50	Allen and Hanburys
,, ,,	,,	50	Bayer
,, ,, .	,,	50	Burroughs Wellcome
,, ,,	ampoules	50	British Drug Houses
,, ,,	tablets	50	,, ,,
,, ,, .	,,	100	
,, ,,	,,	20	Lilly ,,
,, ,,	.	50	,,
,, ,,	,,	100	,,
,, ᴀ ,,	,,	50	Crookes
,, ,, .	ampoules	50	,,
,, ,, .	tablets	50	Parke, Davis
,, ,,	,,	50	Roche
,, ,,	,,	25	Squibb
cotinamide	ampoules	50	British Drug Houses
,,	tablets	50	,, ,,
,,	,,	50	Roche ,,
,,	ampoules	50	
lonin .	,,	50	Glaxo
,, ..	tablets	50	,,

Daily need = ? 30 to 350 mgm.

TABLE 12: TABLETS AND CAPSULES CONTAINING VITAMIN B₁ VITAMIN B₂ AND NICOTINIC ACID

some of these preparations the vitamins are derived from natural sources, such yeast, and some are mixtures of synthetic products. These are useful when ciencies have developed or are suspected. In general, the members of the min B complex are so widely distributed in ordinary foods that it is unusual add a daily need of vitamin B as such, unless the diet is known to be poor.

TABLE 12

Name	Description	B₁		B₂ (G) (Riboflavine)		Nicotinic acid or Nicotinamide	Remarks	Ma
		I.U. B₁ in 1 tab. or cap.	Mgm. B₁ in 1 tab. or cap.	S.U. B₂ in 1 tab. or cap.	Mgm. B₂ in 1 tab. or cap.	Mgm. in 1 tab. or cap.		
Aluzyme ..	tab.	15	0·04	present		present		Al
Befortiss (1)	,,	100	0·3	present		present		Vi
Befortiss (2)	,,	333	1·0	present		present		
Befortiss (3)	,,	1,000	3·0	present		present		
Benerva Cpd. ..	,,	333	1·0	400	1	·15		Ro
Betalin Cpd.	cap.	333	1·0	40	0·1	—		Li
B and G capsules	,,	67	0·2	16	0·04	—		Sq
Brewers' yeast ..	tab.	15	0·04	20	0·05	—		Al
Cofron ..	,,	5	0·015	40	0·1	—	+ iron	Cr
Ferrofax ..	cap.	9	0·03	present		—	+	Sq
Hebulon ..	,,	25	0·07	present		present	+ liver + iron	Sq
Lextron ..	,,	50	0·15	25	0·06	present	+ liver + iron	Li
Ventron ...	tab.	22	0·06	5	0·012	—	+ iron	Pa
Vitamin B capsules	cap.	150	0·45	40	0·1	—		At

S.U. = Sherman units.

**TABLE 13: OTHER PREPARATIONS CONTAINING VITAMIN
VITAMIN B₂ AND NICOTINIC ACID**

Three of these products are derived from natural sources; they should be pref to the synthetic products when mild deficiencies are under consideration.

TABLE 13

Name	Description	B₁		B₂ (G) (Riboflavine)		Nicotinic acid or Nicotinamide	Made
		I.U. B₁ in 1 gm.	Mgm. B₁ in 1 gm.	S.U. B₂ in 1 gm.	Mgm. B₂ in 1 gm.	Mgm. in 1 gm.	
Bemax	powder	17	0·05	16	0·04	0·03	Vitamin
B & G syrup ..	syrup	50	0·15	4	0·01	—	Squibb
Malt extract ..	thick syrup	present		present		present	B.P.
Marmite ..	stiff paste	10	0·03	24·0	0·06	0·64	Marmite
Vitamin B complex (1)	powder	100	0·3	40	0·1	—	Napp
Vitamin B complex ..	powder	200	0·6	80	0·2	—	,,

**TABLE 14: TABLETS, CAPSULES AND AMPOULES CONTAINING
VITAMIN C (ASCORBIC ACID) ONLY**

All these are synthetic preparations of ascorbic acid for administration orally hypodermically. They can be used for protection if natural products are unobt able or are not tolerated; 5 mgm. ascorbic acid can be dissolved in each of t

eds daily for the bottle-fed infant, giving an intake of 30 mgm. in the day.
he chief use of these products, however, is in the sphere of treatment.

TABLE 14

Name	Description	I.U. Vit. C contained in 1 tab. or amp.	Mgm. Ascorbic acid in 1 tab. or amp.	Daily need (50 mgm.) contained in		Made by
corbic acid	tablets	100	5	10	tab.	Burroughs Wellcome
,, ,, ...	,,	500	25	2	,,	,,
,, ,, ...	,,	1,000	50	1	,,	
,, ,, ...	,,	100	5	10	,,	Allen and Hanburys
,, ,, ...	,,	500	25	2	,,	,,
,, ,, ...	,,	1,000	50	1	,,	,,
,, ,, ...	ampoules	2,000	100	½	amp.	
,, ,, ...		10,000	500	1/10	,,	
,, ,, ...	tablets	500	25	2	tab.	British Drug Houses
,, ,, ...	,,	1,000	50	1	,,	,,
,, ,, ...	ampoules	2,000	100	½	amp.	,,
,, ,, ...		10,000	500	1/10	,,	,,
,, ,, for infants	tablets	100	5	10	tab.	
,, ,, ...	,,	1,000	50	1	,,	Vitamins Ltd.
,, ,, ...	,,	1,000	50	1	,,	Abbott
ntan	,,	100	5	10	,,	Bayer
,, ...	,,	500	25	2	,,	,,
,, ...	,,	1,000	50	1	,,	,,
,, .. .	ampoules	2,000	100	½	amp.	,,
,, ...		10,000	500	1/10	,,	,,
,, in		2,000	100	½	,,	Glaxo
,, ...	tablets	100	5	10	tab.	,,
,, ...	,,	1,000	50	1	,,	,,
valin ..	,,	100	5	10	,,	Lilly
,, ..	,,	500	25	2	,,	,,
vitamon C ..	,,	100	5	10	,,	Organon
,, ,, ..	,,	500	25	2	,,	,,
,, ,, ..	ampoules	1,000	50	1	amp.	,,
,, ,, ..		10,000	500	1/10	,,	,,
navit C	tablets	1,000	50	1	tab.	May and Baker
,, ...	,,	100	5	10	,,	,,
scorbin	,,	1,000	50	1	,,	Richter
,, ...	ampoules	2,000	100	½	amp.	,,
loxon	,,	500	25	2	,,	Roche
,, ...	,,	1,000	50	1	,,	,,
,, ...	,,	2,000	100	½	,,	,,
,, forte ..	,,	10,000	500	1/10	,,	,,
,, (babies) ..	tablets	100	5	10	tab.	,,
os. ac. ascorbic .	,,	100	5	10	,,	National War Formulary
,, ,,	,,	1,000	50	1	,,	
amin C	,,	100	5	10	,,	Crookes
,, ,, ...	,,	1,000	50	1	,,	,,
,, ,, ...	ampoules	2,000	100	½	amp.	,,
,, ,, ...	tablets	500	25	2	tab.	Parke, Davis
,, ,, ...		1,000	50	1	,,	,,
,, ,, ...	ampoules	10,000	500	1/10	amp.	,,
,, ,, Pabyrn	tablets	100	5	10	tab.	Paines and Byrne
,, ,, ,,	,,	500	25	2	,,	,,
,, ,, ,, ..	,,	1,000	50	1	,,	,,
,, ,, ,,	ampoules	2,000	100	½	amp.	,,
,, ,, ,,	,,	10,000	500	1/10	,,	,,

Daily need = Infants .. .. 10 to 30 mgm. daily.
⇒ Child and adult .. 50 mgm. daily.

TABLE 15: OTHER PREPARATIONS CONTAINING VITAMIN C (ASCORBIC ACID)

These are natural products; they are standardized (except the fresh orange ju and some of them are brought up to a required level with synthetic ascorbic These fruit preparations contain vitamin P as well as vitamin C. They are pre able to the synthetic products for purposes of protection.

TABLE 15

Name	Mgm. Ascorbic acid in 100 c.cm.	Mgm. Ascorbic acid in 100 gm.	Daily need (Child or adult) 50 mgm. in	Daily need (infant) 10 to 30 mgm. in	Made by
Blackcurrant purée	66	55	15 tsp.	3 to 9 tsp.	Ministry of
Blackcurrant syrup	62	45	16 ,,	3 to 9 ,,	,,
Orange juice—					
Govt. conc. ..	200	150	5 ,,	1 to 3 ,,	,,
Orange juice (fresh)	22 to 90	22 to 90	11 to 40 ,,	3 to 9 ,,	Fresh fruit
Orange syrup ..	213	160	4½ ,,	1 to 3 ,,	Carter
Ribena	75	55	13 ,,	3 to 8 ,,	,,
Rose-hip powder	—	1,000 to 3,000	2 to 5 gm.	—	,,
Rose-hip syrup ..	200	150	5 tsp.	1 to 3 tsp.	B.P. Codex
,, ,, ..	200	150	5 ,,	1 to 3 ,,	Carter
Hipexa ..	—	1,000	5 gm.	1 to 3 tab.	Wander

TABLE 16: COMBINATIONS OF VITAMINS; TABLETS, CAPSULE AND AMPOULES

For what purposes would a mixture of vitamins be prescribed? It is unlikely t such mixtures would be prescribed in *treatment;* the amounts in any one tal or capsule rarely exceed the daily need. If they were intended to remedy a gene lack and thus to protect the patient from all deficiencies, then any one caps or tablet might be expected to contain part only of the day's needs of each vitar (with the possible exception of vitamin D). Yet some of the tablets contain whole daily need of both vitamins A and D, and only a small fraction of the ne of both vitamins C and B. If a general deficiency were suspected, it would more satisfactory to prescribe separately, an A and D product, a vitamin B prepa tion, and a vitamin C preparation. The doses could then be regulated accordi to the patient's need.

TABLE 16

Name	Description	Vitamin A		Vitamin B_1			Riboflavine		Nicotinic Acid	Vitamin C			Vitamin D		Made by
		I.U. in 1 tablet etc.	Daily need (4,000 units) in	I.U. B_1 in 1 tablet etc.	Mgm. B_1 in 1 tablet etc.	Daily need (500 units) in	S.U. in 1 tablet etc.	Mgm. in 1 tablet etc.	Mgm. in 1 tablet etc.	I.U. in 1 tablet etc.	Mgm. ascorbic acid in 1 tablet etc.	Daily need (50 mgm.) in	I.U. in 1 tablet etc.	Daily need (750 I.U.) in	
Abecedin ..	tablets	4,500	1 tab.	50	0·15	10 tab.	present		present	200	10	5 tab.	600	1 tab.	Napp
Abidon ..	capsules	4,500	1 cap.	30	0·10	17 cap.	10	0·25	present	200	10	5 cap.	450	1½ cap.	Parke, Davis
Abidon with vit.C	"	4,500	1 "	50	0·15	10 "	20	0·50	present				450	1½ "	,,
ABD ..	"	5,000	1 "	30	0·10	17 "	10	0·25					500	1½ "	Abbott
ABD ..	"	3,000	1¼ "	100	0·30	5 "	40	1·0					200	3½ "	Allen and Hanburys
ABD G ..	capsules	6,600	⅔ "	33	0·10	15 "	1	0·02					1,320	⅓ "	Squibb
Betacevalin ..	tablets	1,350	3 tab.	167	0·5	3 cap.				250	12·5	4 cap.	100	7½ tab.	Lilly
Complevite ..	"			67	0·20	7½ tab.				133	6·5	8 tab.			Vitamins Ltd.
Crysto-vibex vit.C	"	1,000	4 "	167	0·5	3 "			0·5	250	12·5	4 "	200	3½ "	Parke, Davis
Davitamon Five	"	4,500	1 cap.	50	0·15	10 "			0·5	200	10	5	900	⅓ cap.	Organon
Halibol B ..	capsules	4,500	1 cap.				present						1,320	⅓ "	Allen and Hanburys
Medicaps ..	"			33	0·10	15 cap.	1		present	500	25	2 cap.			Savory and Moore
Multivite ..	pellet	2,500	2 poll.	167	0·50	3 poll.				250	12·5	4 poll.	250	3 pell.	British Drug Houses
Nestrovite ..	tablets	2,500	2 tab.	167	0·50	3 tab.	20	0·5		400	20	2½ tab.	500	1½ tab.	Roche
Nicorbin ..	"	4,500	1 cap.	33	0·1	15 "			10	500	25	5 "	600	1¼ cap.	Glaxo
Pentakaps ..	capsules	6,000	⅔ tab.	75	0·20	7 cap.			15	200	10	2 cap.			Abbotts
Priovit ..	tablets	4,500	1 cap.	333	1·0	1½ tab.			10	500	25	2 tab.	450	1½ cap.	Bayer
Supavite ..	"			200	0·60	2½ "				500	25	2 "			Angier
Vitamin quota ..	capsules			100	0·30	5 cap.		pre sent							Crookes
Vitamintonicglan.	glanules	6,200	⅔ glan.	100	0·30	5 glan.		pre sent		200	10	5 glan.	945	⅔ glan.	Armour

TABLE 17: PREPARATIONS CONTAINING MALT

This table repays careful study, as it shows how the preparations vary in concer tration of cod-liver oil, and what large amounts of some of the products woul need to be taken to protect against rickets.

TABLE 17

Name	Percentage C.L.O.	Units per teaspoon		Number of teaspoons containing day's need		Remarks	Made by
		A	D	(4,000 I.U) A	(750 I.U.) D		
Extract malt ..	Per cent.	+	.	+		B complex not standardized	B.P. Code
Extract malt with ol. vitamin.. ..	15	800	80	5	9		B.P.
Extract malt with vitamin.. ..	45	2,400	240	2	3		B.P. Code
Halivermalt with Viosterol ..		5,000	1,425	1	½		Abbotts
Halibol malt ..		2,100	280	2	3		Allen and Hanbury
Halimalt		6,100	610	⅔	1¼		Crookes
Kepplers oil and malt	23	1,220	122	4	6		Burroughs, Wellcome
Maltogen	4	200	20	20	37		Parkes
Malt extract with cod-liver oil ..	15	800	80	5	9	.	Stanley
Malt extract with cod-liver oil ..	15	800	80	5	9		Boots Glaxo
Maltoline		1,570	350	2¼	2		
Ostomalt		1,470	335	2¼	2¼	also C	
Radiomalt		350	175	12	4	+B complex	British Dru Houses
Roboleine		504	170	8	4¼		Oppenheim
Vimaltol		330	180	13	4		Wander
Virol		250	230	16	3	also C	Virol

TABLE 18: MISCELLANEOUS SYRUPS

Some of these preparations are quite well balanced although most of them have a rather low vitamin C content.

TABLE 18

Name	I.U. vit. A in 1 teaspoon	I.U. vit. B₁ in 1 teaspoon	Mgm. vit. C. in 1 teaspoon	I.U. vit. D in 1 teaspoon	Remarks	Made by
Abecedin emulsion	6,300	70	14	840		Napp
Brestol	150		present	140		Cow and Gate
Coco-vitamin compound ..	965			216	+ B₁	Lilly
Haliborange ..	3,000		5	750		Allen and Hanburys
Halycitrol ..	3,640		3	440		Crookes
Irradex	1,100	12·5		365	plus minerals	Parke, Davis
Minadex.. ..	3,000			500	plus minerals	Glaxo
Nestrovite ..	2,500	80	15	500		Roche
Parivitan ..	3,000			500	plus minerals	Richter
Radiostoleum emulsion with vitamin C ..	7,500		12·5	1,500		British Drug Houses

These tables were prepared at the request of the Executive Committee of the British Pædiatric Association. I am indebted to the officers of this Association for encouragement and help.

CHILD HEALTH

IX.—THE DIAGNOSIS AND MANAGEMENT OF MENTAL DEFICIENCY

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THE diagnosis of mental deficiency is one that presents peculiar difficulti and this is not solely because of those inherent in any medical diagnosis whi in the case of amentia, may be hard enough. But there is often a reluctance making such a diagnosis on the part of the practitioner whose training in t branch of medicine has hitherto been inadequate, in spite of the fact that condition is so common that there must be few medical practices that do include several victims of the condition. But the reluctance of the practition is nothing to the resistance of the parents. Everyone knows that mental deficien is commonly inborn, and no parent welcomes the implied suggestion that he or is of inferior stock, quite apart from the mystery and horror that still surrou any suggestion of mental illness. Fortunately, however, there is not the sa urgency for a final diagnosis in amentia that there is in other conditions, and practitioner who is in doubt will do well to reserve judgement for a while and th if necessary, to call in a second opinion. This latter course is always desirable, a seldom presents any difficulty, as every Local Authority of County status has employ officers with special training and experience in the subject, and many these have become by long practice recognized experts. It is of course in the fi eighteen months or so of life that the diagnosis is most difficult, but there is seldo any need for the suggestion to be made and, unless there is some such ne (as in the case of a proposed adoption), the practitioner will do well to avoid it. should remember that the early mortality among low-grade aments is such th providence may intervene and leave the parents in an ignorance which could n usefully have been ended; that to spare the parents is itself a desirable end; and th nothing could be so damaging to his professional reputation as such a diagnos if it were belied by subsequent events. Yet the time will come when the ordina parent will begin to suspect that there is something wrong, and this, because his natural reluctance to express his fears in as many words, may be sooner tha is thought. The correct timing of the moment for an explanation of the existen of amentia is one of the most difficult things in handling a case. But once th parents' fears have been interpreted and the diagnosis made the issue must be face squarely, although it will be best at this stage to avoid the use of the rather har term "mental deficiency": rather explain that bodily and mental progress procee independently of one another, and that in this case the development of the child mind is not as rapid as that of his body. At the same time, the possibilities of im proving progress by appropriate training, and the limitations of medical treatmen should be explained, so that the parent may be spared wasting his substance i

vain on the exponents of whatever "-pathy" happens to be in vogue at the moment. The following is typical of the type of case in which evasion spoiled a child's chances of being trained to useful citizenship:—

Hazel R. was excluded from school by the family practitioner at the age of six on account of "general ill-health." The next year a school medical officer certified her "a high grade mental defective with nervous instability; she was quite well and suitable for special school." However, this was refused by the parents, and from then on the child had practically no education, being certified by the family practitioner unfit on account of "nerves," "bronchial catarrh," "dyspepsia" and "debility." All this time she was fussed and worked up by her parents into a highly temperamental state, the family environment being as bad as it could be from the point of view of neuroses. Her final condition (at age thirteen) was an intelligence quotient of 62 per cent. and so neurotic a personality that it was doubtful if she could profit from special education, even if her parents allowed it.

DIAGNOSTIC PROCEDURE

The child's history.—The actual procedure for the diagnosis of amentia follows the same lines as that for any other medical condition. First comes the past history, which in this case begins early in gestation. Did the mother suffer from any illness or deprivation while carrying the child? Then, was the birth at term? What were the circumstances of the confinement? Was there any evidence of birth injury or asphyxia? Were there infantile-convulsions or marasmus? From what illnesses did the patient suffer? It is true that such questions may appear irrelevant, since the diagnosis of amentia can scarcely hang on any of them, for it is quite possible for a child to have started with one or more of these handicaps and yet to grow up mentally normal. But if the diagnosis of mental deficiency has eventually to be made the parents will often, without any further suggestion on the part of the practitioner, have picked on some possible explanation of the condition which will make it easier for them to accept the verdict. According to the age of the child the past history will probably have involved inquiry into the date of certain of the more prominent milestones in its developmental course—the age of walking, talking, acquiring cleanly habits, and so on. These are dealt with more fully on p. 183. In children who have left school a history of frequent dismissals, or of repeated changes of employment for no apparent reason, is often significant.

Next, inquiries should be directed to the *family history;* but it is not often that the required information will be readily forthcoming. Significance may be attached to such things as other cases of amentia in the family, insanity, a neuropathic taint, alcoholism, recidivism, prostitution and illegitimacy. Information of such characteristics may be obtained from Probation Officers, officers of the N.S.P.C.C. and other such social agencies; but the family practitioner, if he has known the family for any length of time, is probably in a better position than anyone else in this respect. It is essential, however, that an adverse family history should be kept in its proper perspective. Certainly parents who exhibit no sort of taint of this kind may produce a child who exhibits any degree of amentia and, although the reverse has excited less interest, there is no reason to suppose that a child of superior mental attainments might not come of the most unpromising heredity. At any rate, a normal child born to parents of subnormal intelligence or temperamental instability starts life under a severe handicap, and the knowledge of it should,

if anything, put the practitioner on his guard against an assumption that any deviation from the normal in the case of the child is due to mental defect. Accurate and unprejudiced assessment must come first.

GENERAL EXAMINATION.—Physical examination is of little value in diagnosis of amentia; indeed, if the child be apprehensive of doctors, as many of them are, it is better omitted. But in all cases it is necessary first to make s that the apparent retardation is not the product of sensory loss. *Sight*, even in illiterate, may be tested by the use of an E card, and in the hands of those who accustomed to applying it this may be of some use as an intelligence test, si a normal child of seven can quite readily grasp the method. But *hearing* is m important. A child who can neither read nor hear what is said to him is obviou confronted with an almost insuperable difficulty, although one that could be ov come by suitable training. Probably every certifying officer can recall child thought to be mentally defective whose sole trouble has been deafness. To reco nize the degree of deafness is no easy matter; to identify the degree of intelligen behind it is even more difficult. The former can perhaps be elucidated by app to the local school medical officer, many of whom now have the audiometer their disposal; the latter can be ascertained by the use of appropriate performan tests (see p. 184).

THE ASSESSMENT OF MENTAL DEFICIENCY

Stigmata of degeneracy have received an unwarranted attention in the pa Individual stigmata are probably no commoner among defectives than among t normal population at large. A combination of stigmata is of little more significan and it is unwise to place any reliance on physical evidences of amentia unless t patient presents the bodily characteristics of certain well-known types that a always or usually associated with their presence. Such are:—

(A) *TYPES ALWAYS ASSOCIATED WITH AMENTIA—USUALLY LO GRADE:—*

    (1) *Mongolism.*—Growth is stunted, the head is small and round, with flattened occiput. The complexion is ruddy, the nose snub, the ey set at a slight obliquity with epicanthic folds; the ears are small ar round. The tongue develops deep fissures after infancy. The hand are stubby, the little fingers small and incurved, and the palmar creas abnormal. There is a crease between the great and second toes.

    (2) *Microcephaly.*—The defect is limited to the skull, which is small with circumference of 17 inches, or less, instead of the normal $21\frac{1}{2}$ inche when fully grown. The vertex slopes upward and the chin is wea giving a curious rather bird-like appearance.

    (3) *Epiloia*, although rare, can be recognized unmistakably by the associa tion of severe epilepsy with a butterfly eruption of small papules th size of a pin's head to a lentil—the adenoma sebaceum.

    (4) *Cretinism* (untreated) causes infantilism associated with a muddy com plexion and the well-known signs of hypothyroidism, such as slow pulse, dry skin, and dry hair; the tongue protrudes, the hands ar

stubby, and there is often a pot-belly and umbilical hernia. There may be supraclavicular pads of fat. In treated cretins the physical improvement may leave the mental condition little, if at all, improved, so that the physical evidences of the condition may be completely masked.

(B) *TYPES THAT MAY OR MAY NOT BE ASSOCIATED WITH MENTAL DEFICIENCY:—*

(1) *Hydrocephaly.*—Increase in the circumference of the skull, associated with globular enlargement and gaping sutures.

(2) *The plegias*, involving one or more limbs. When the muscles of the face are affected such cases present the greatest difficulty in the assessment of the mental level. The spastic lips and tongue, with the associated dribbling and dysarthria, give an appearance of profound mental defect which may be belied by the response to intelligence tests, if the examiner can succeed in interpreting the child and so penetrating beneath the surface.

In considering physical types of aments the examiner must be on his guard against some who combine an attractive physical appearance with a specious glibness. One such did a flourishing trade on his way to and from a special school for mental defectives by selecting a likely looking victim to sit by on the bus, and pretending to have lost his fare. And the danger of relying on their uncorroborated evidence is shown by the following case:—

Norman L., aged ten, was taken to see a consulting pædiatrician on account of epilepsy. He read simple words, recited some multiplication tables, and told a circumstantial story of victimization by his schoolfellows who, he said, among other things would pretend to whisper to him and then spit in his ear. The result was a report that said he was "not M.D." and advised removal from the school to prevent further damage to his nerves. Later the boy was examined in the school, where the headmaster told how he was the perpetrator of the very tricks that he alleged against the others, and where a full intelligence test revealed that his intelligence quotient was 61 per cent.

The assessment of mental deficiency depends essentially upon a comparison between the attainments of the subject and of those of an average person of the same age. The table below sets out the principal milestones in human development, although it must be remembered that some of these are subject to fairly wide variation. To take speech, for example, retarded speech is one of the most characteristic features of the defective, but the difference between a working-class and a professional-class environment may be equivalent to about eight months in language development. But if a proper perspective is maintained of development as a whole the list may be a useful one:—

TABLE 1

Birth	..	grasp reflex strong enough to allow baby to be raised as he holds adult's finger
Months		
0 : 2	..	waves arms when lying on back
0 : 3	..	recognizes mother and holds out his hands to an object
0 : 4	..	holds head steady and can lift it when prone; follows light with eyes
0 : 5	..	sits with slight support; crows and coos, making many vowel and consonant sounds
0 : 6	..	can clutch at an object offered him, pushes with feet if held up; turns towards sounds; takes an interest in other children; understands NO

Months

0 : 7 .. can sit alone for a short time and roll from back to front
0 : 9 .. crawls; begins to communicate by expression and sound; tries to pull himself
          sits without support

Years

1 : 0 .. stands with support and walks with help; begins to cooperate in dressir
          puts a biscuit to his mouth; can hold drinking cup; says two or three words
1 : 6 .. can walk alone; tries to climb stair; tries to put on shoes and use a spoon; c
          indicate nose, eyes and hair; can build a two-block tower imitatively; l
          achieved bowel control; says five or six words
2 : 0 .. has bladder control; can build a three to six-block tower; obeys simple orde
          and can indicate two or three objects in a picture, and name common objec
          such as penny and watch; puts two words together and has vocabulary
          200–300 words; can draw a vertical stroke imitatively
2 : 6 .. can match colours; can put different shapes into appropriate insets; is beginni
          to do up large buttons and carry ordinary vessels without spilling
3 : 0 .. puts shoes on, opens doors, and carries articles safely; can copy circle; articu
          tion is fairly correct
4 : 0 .. can button clothes; can make a complete sentence and has a vocabulary
          800–900 words; can copy a square with right-angled corners and draw
          rudimentary man; can count four pennies; knows of what a dress, a ch
          and a shoe are made
5 : 0 .. can carry out a triple order, give age, distinguish morning and afternoon, co.
          two out of three different series of four objects
6 : 0 .. names four coins (halfpenny, penny, sixpence, shilling); knows right from l
          knows number of fingers without counting them
7 : 0 .. recognizes simple similarities (e.g., wood and coal); copies a diamond; t
          a bow knot and knows the names of the days of the week with check questic
          (e.g., the day before Tuesday)
8 : 0 .. counts backwards from 20—1; gives date
9 : 0 .. names six coins (as before, with florins and half-crowns); gives simple chan
          names months; repeats four numbers backwards; tells time from watch
10 : 0 .. names months with check questions; repeats six numbers; names twenty-ei
          words in one minute

INTELLIGENCE TESTS.—For the accurate assessment of intelligence it
necessary to give one of the recognized series of intelligence tests, of which sor
of the above are examples. This, however, is rather too long a procedure for t
average practitioner, and a full description of them is beyond the scope of :
article such as this. There are various scales of tests, each of which has its advocate
although in general they follow a similar pattern, differing in minor details of a
assignment. Of the *verbal tests*, the Terman-Merrill is a good one for the occasion
user, because it not only gives a full method of applying the tests but also a wi
range of the answers that indicate success or failure. In giving such tests it
absolutely essential that the detailed routine of applying them should be strict
observed.

Of the various *performance tests*, Raven's Progressive Matrices can be recon
mended. They owe much less to the effects of education and are particularly usef
in cases in which speech or hearing are involved. They consist of five series (
designs, the complexity increasing from first to last in each series. From each desig
a piece is missing and the subject has to pick out one of a number of possib
completions to fill the gap.

CERTIFICATION

In those cases in which certification becomes advisable two medical certificate
are required. These have to be completed on examination within twenty-one day

f the start of the legal proceedings, by two independent registered medical practitioners who have examined the patient separately. In practice, one of these s the patient's usual medical attendant, if he has one, and one must be approved or the purpose by the Local Authority or the Board of Control. The certificate has not only to state that the patient is mentally defective but has to put him into one of the three statutory grades—idiot, imbecile or feeble-minded—according to the legal definitions as printed in parenthesis on the certificate. The reasons for this are given under the headings of "facts observed at the time of examination," "facts observed previously," and "facts reported by others." Under whatever heading the facts are given they must be presented with all the care required of evidence in a court of law, indicative of mental deficiency and not readily explicable on other grounds. Thus to write "he cannot read simple four-letter words . . ." would not be as telling as "in spite of education in an ordinary elementary school he cannot read simple four-letter words . . ." In the same way "he does not know how many halfpenny buns he would get for ninepence" is better than "he cannot do simple sums in mental arithmetic." Under the heading of "facts communicated by others" the full name of the witness and his relationship to the defective should be recorded. Such witnesses often have little idea of the nature of the inquiry and are apt to retail all they know to the patient's advantage. It is a good thing after completing this section to read it aloud to the witness in order to make quite sure that the facts recorded are what were intended.

TREATMENT

Of treatment there is at present little to be said. In new-born babes who show evidence of increased intracranial pressure the use of hypertonic rectal salines has been advocated; two ounces of a 10 per cent. solution are run in and repeated in four hours if necessary. But the results of injury to the delicate structures of the brain at an early age are so tragic that the decision to intervene calls for as great a sense of responsibility as anything in medicine.

Cretinism is the only type of amentia which can be cured, and the earlier the treatment starts the more complete is the cure, and vice versa. Recognition after the end of the first year is not likely to lead to full mental recovery. Treatment is usually given in the form of thyroideum siccum, beginning with $\frac{1}{4}$ grain twice a day and increasing the dose to the limit of the patient's tolerance, usually to about 1 grain a day in infancy. Excessive dosage is shown by diarrhœa, loss of weight, rapid pulse and irritability. Once the proper dose has been established it must be kept up and increased as the child grows older. At the same time as thyroid treatment is begun the daily vitamin D may advantageously be increased to 1500 International Units, to counteract any tendency to rickets brought out by the infant's rapid growth.

Mongolism.—The success of thyroid treatment in cretinism and the superficial resemblance of some mongols to cretins has naturally led to the administration of thyroid extract to the former. But there is no scientific justification for this, and although most mongols are given thyroid sooner or later it never does them any good.

Once the diagnosis of low-grade amentia is definitely established there is little to be said for any other form of treatment. Elaborate orthopædic treatment, for instance, should be avoided, and the use of any immunization or chemotherapy might give rise to more regret than its omission.

The *training of the defective* has received much attention and its success is confirmed by the satisfactory after-histories of most of the boys who have passed through special schools. The headmaster of one such school in London was able to report after the last great slump that all the old boys he had been able to follow up had been in regular employment. The success of such schools, whether day or residential, depends upon four factors—small classes, short periods devoted to an one subject, the development of the mind through the cultivation of manual dexterity, and the avoidance of an academic standpoint in education, even in "the three R's". Such schools are available only for defectives of higher grade who have passed the age of seven; below that age, if fit for school, they go to the ordinary schools. In the larger towns there may be an "Occupation Centre" for the low grade defectives. Here the same principles are observed, with dancing, singing and nursery games, "handkerchief drill," clay modelling, weaving in various forms and so on. The "product" may not be able to contribute to his own support, but he is away from his parent for a time each day and is made into a more social creature.

CONCLUSION

The parents of the defective, especially if he is of low-grade, are beset by all sorts of problems, social, educational, legal and medical. It is a good thing therefore in all cases to put them in touch with the representative of the Local Mental Deficiency Acts Committee whose workers can often be of great help. The medical officer is available for consultation, their social worker can tackle many of the domestic and educational difficulties, and if certification finally becomes necessary the Clerk will see that the proper procedure is carried out. Educable defectives need no special management, since they are mostly capable of social adaptation and taking their place in the community. It is only when this adaptation fails that they come within the scope of the Mental Deficiency Acts. But whatever the state of the patient's mind and behaviour the practitioner has a part to play which no one else can fill as well. He can free the parents of that sense of guilt and frustration which so often clouds them; he can explain how worth while are efforts directed to proper training, whilst at the same time putting a curb on fancy methods of treatment; and he can act as the intermediary between the parents and those who have the resources and the powers to be of help.

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Suggestions for further reading:—
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The intelligence tests quoted are:—
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NOTES AND QUERIES

SULPHONAMIDE PROBLEMS

QUESTION (from a subscriber in Ireland).—It is stated in an article (*The Practitioner*, August 1944, 153, 97) by Brigadier Whitby that sulpha-pyridine, sulphathiazole, sulphamezathine and sulphadiazine are all active against *Staphylococcus aureus*. I was under the impression that sulphathiazole and sulphadiazine were the only ones with such action. Also it is stated that sulphadiazine need only be given every six hours; I thought this statement would apply only to sulphamezathine. I shall be grateful if you will be so kind as to clarify the above.

REPLY.—All four compounds are active against *Staphylococcus aureus* when tested *in vitro* and *in vivo*, but the activity of sulphathiazole is the greatest, and this, coupled with the infrequency of unpleasant side-effects, has made it the sulphonamide of choice for the treatment of staphylococcal infections. Sulphadiazine is excreted more · slowly than either sulpha-pyridine or sulphathiazole and so can be administered six-hourly. Verification of these views can be found in the following publications.—

Whitby, L. E. H. (1938). *Lancet*, 2, 1095
Report by the Council on Pharmacology and Chemistry (1943) *J. Amer. med. Ass.*, 121, 1008
Wheeler, G., and Plummer, N (1942) *Ann int Med* 16, 269
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FEVER AND HEART FAILURE

QUESTION (from a subscriber in Kent).—A patient of mine, suffering from a slight degree of heart failure from myocarditis (auricular fibrillation) has developed some pyrexia, probably due to an infection of his congested chest. A physician whom I consulted told me that owing to his failing heart the real temperature of the patient should be considered about 2 degrees higher, so that instead of 99 3° F, for example, he would really be 101·3° F. Is this generally recognized fact?

REPLY (by a cardiologist).—There is no definite evidence that congestive heart failure by itself can cause pyrexia, although the possibility cannot be excluded. On theoretical grounds the increased metabolic rate which is found in the later stages of heart failure might be expected to be accompanied by a rise in temperature, but clinical evidence does not bear this out. The sound practical rule is that in every patient with congestive heart failure accompanied by fever, complications that might be responsible for such fever must be carefully sought for. The common complications are pulmonary infarction, broncho-pneumonia, pulmonary thrombophlebitis, active rheumatic infection and coronary thrombosis. If in any given case these complications can be excluded and the rise in temperature does not exceed 1° F, then it is probably safe to assume that the heart failure is responsible for the slight degree of fever. Incidentally, it should be borne in mind that in patients with heart failure the mouth temperature is particularly unreliable, on account of the considerable degree of mouth breathing necessitated by the dyspnœa. In these cases the rectal temperature is the only reliable guide to the actual body temperature.

BARIUM SULPHIDE IN HIRSUTIES

QUESTION (from a subscriber in Wales).—I remember seeing a preparation of barium being recommended as a safe and reliable method of removal of superfluous hairs. Would you please say which barium salt is suitable for the purpose and give particulars of its application?

REPLY (from a dermatologist).—Barium sulphide 12 parts, with zinc oxide and starch each 18 parts, made into a paste with water, removes hair effectively. It is, however, an entirely unsatisfactory remedy for the removal of superfluous hairs because it is apt to cause dermatitis, sometimes of an intractable nature. Its use for this purpose is therefore not recommended.

AN UNUSUAL CASE OF ECTOPIC GESTATION

ON January 2, 1945, a woman was sent to the Limerick County Infirmary, with a diagnosis of abdominal hæmorrhage; probably ruptured extra-uterine pregnancy. Examination confirmed the diagnosis. The patient was so exsanguinated that a transfusion was necessary before operation could be considered. Laparotomy showed a ruptured extra-uterine pregnancy, the fertilized ovum having escaped into the abdominal cavity, "settled down," and developed on the peritoneal surface of the posterior wall of the uterus. The fœtus, about six weeks, was floating in the blood in the abdominal cavity.

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PRACTICAL NOTES

THE TREATMENT OF TROPICAL ULCER

A COMBINED treatment of intravenous injections of mapharsen and local application of sulphanilamide or sulphadiazine powder is recommended by Capt. M. H. Feinman (*New England Journal of Medicine*, October 26, 1944, **231**, 578) for tropical ulcer, variously described as ulcus tropicus, tropical sloughing phagedena and Naga sore. The condition is prevalent in India, Indo-China, southern China, the Philippines, Malaya, the Solomon Islands, and particularly in Amazonia, and the author, who is working in the South Pacific, has tried different forms of treatment, including potassium permanganate, sodium iodide orally and hydrogen peroxide locally, copper sulphate, neoarsphenamine, mercurous chloride and other substances, some of which seemed to clean up the ulcer but failed to close the sore. Mapharsen, in dosage of 0·03 gm. initially and then 0·06 gm. for subsequent doses, the injections being given intravenously at three-day intervals for the first three doses and then at five-day intervals until healing, in conjunction with local application of sulphanilamide or sulphadiazine powder, proved most effective. Used alone, however, the sulphonamide powder, although cleaning the ulcer, failed to produce healing. After cleaning of the ulcer an occlusive petroleum jelly dressing is applied and changed infrequently. The author has used the method with success in ambulatory patients. One man had numerous lesions on the legs of two months' duration, in spite of treatment. Under mapharsen-sulphanilamide treatment, with daily dressings for one week and then every fifth day, the lesions healed in three weeks. In a second case of indurated ulcer of three weeks' duration, complete healing was obtained in three weeks, and in a third case, of superficial ulcers on both arms of four weeks' duration, drying and healing of the lesions occurred after one injection of mapharsen. It is stated that spirochætes and fusiform bacilli seem to be definite etiological factors in tropical ulcer. The ulcers usually occur on broken or injured skin, and a warning is given that all troops should be cautioned in order to ensure the prompt application of a bactericide and first-aid dressing to prevent ulcer formation.

THE LENGTH OF THE SMALL INTESTINE

ACCORDING to Professor J. B. Cleland (*Medical Journal of Australia*, Sept. 30, 1944, **31**, 359) the small intestine in man is much more variable in length than is generally recognized. The measurement he took was from the termination of the duodenum to the cæcum, and it was made when the intestine had been detached from the mesentery. In 100 bodies the le[ng]th of the small intestine varied from 13 to 37 f[eet] in seventeen cases the length was less t[han] 20 feet, and in four cases it was over 30 f[eet] The length did not seem to bear any rel[ation] to the length or size of the body. Chil[dren] may have a longer small intestine than s[ome] adults, some of the measurements obtaine[d in] children being as follows:—28 feet in a boy [of] fourteen years, 16 feet 4 inches in an infant [of] nine weeks, 15 feet in an infant aged t[wo] months. So far as could be made out, non[e of] the individuals had been handicapped by [a] short intestine. Taking the average width of small intestine to be 2¼ inches (excluding fol[ds]) the area of the small intestine when 13 feet l[ong] would be 2·7 square feet, compared with [an] area of 7·7 square feet when the length i[s 37] feet. Whether or not this big variation in [area] has any effect upon the physiology of the sub[ject] is a matter for speculation.

A NEW METHOD OF STAINING TUBERCLE BACILLI

IT has been known for many years that flu[or]escence microscopy is a more accurate met[hod] of demonstrating tubercle bacilli than the o[rdi]nary microscopic methods using the Zi[ehl-]Neelsen stain. Expense, both of apparatus [and] of special stains, renders the method unsuit[able] for routine purposes, but F. O. W. V[ ] (*Journal of the Iowa State Medical So[c.]*, October 1944, **34**, 433) claims to have evol[ved] a method which has many of the advantage[s of] fluorescence microscopy in the detection [of] tubercle bacilli and yet can be carried ou[t in] any laboratory. It consists of the use of O[sol] stain and dark-field illumination. The fi[rst] smear (of sputum) is covered with ca[rbol] fuchsin which has been brought to the boil[ing] point two to three times. Decolorization [is] then brought about with 5 per cent. sulph[uric] acid. After washing with water the smea[r is] treated with the Osol solution: 10 per c[ent.] sodium sulphite solution (20·0 absolute alco[hol] or 96 per cent. alcohol to 100 c.cm. of liqu[id]) for 10 to 15 seconds. It should be noted t[hat] this solution does not keep well. For examin[ing] the stained smear a Zeiss cardiod conden[ser] and an oil-immersion (90/1·25-0·8) object[ive] with iris and paraplane oculars are used. T[he] diaphragm should be closed for dark-fi[eld] examination and open (1·25) for bright-fi[eld] examination. The source of illumination i[s a] 250 W. bulb in a Zeiss sphærolux lam[p.] Tubercle bacilli are stained a brilliant yell[ow-] green colour as seen against the dark b[ack] ground. It is claimed that using dark-f[ield] illumination this method has an advant[age of] 2·3 : 1 over the bright-field method.

PLASMA-THROMBIN ADHESION FOR THE "SUTURE" OF WOUNDS

DURING the inter-war period much experimental work has been done on the possibility of simulating Nature more closely by effecting "suturing" of wounds with plasma-thrombin adhesion. Whilst such "suturing" would not have the tensile strength of ordinary suture material, it would have the following advantages:—(1) it would hasten the healing process; (2) it might eliminate the necessity for sutures, which always produce some degree of inflammatory reaction; (3) it would be useful in wounds where little fibrin is naturally formed. Young and B. V. Favata (*War Medicine*, August 1944, **6**, 80) now report upon the use of plasma-thrombin adhesion of wounds in 69 cases, consisting of 18 cases of repair of traumatic laceration, 8 cases of "selective surgical operations" in which a fine scar was particularly desirable, 10 cases of radical mastectomy, and 33 cases of fixation of skin grafts. Although the precise technique varies with the type of operation and the individual patient, the general principles can be briefly outlined. Stock pooled plasma prepared from a mixture of 50 c.cm. of a 5 per cent. sodium citrate solution and 500 c.cm. of whole blood was used, and it is recommended that it should be stored in 5 c.cm. ampoules made of pyrex and sealed with rubber-stoppered caps. This amount is all that is ordinarily required in wounds of considerable extent. The strength of thrombin used, varied from 250–1000 Iowa units in 10 c.cm. of sterile isotonic solution of sodium chloride. The wound is thoroughly moistened with plasma, excess being avoided, as this results in a gelatinous mass of clot which on concentration releases a considerable amount of fluid. After plasma has been evenly distributed over the wound surfaces, thrombin solution is sprayed on the wound with needle and syringe. The surfaces of the wound are then quickly adjusted and held in apposition for about two minutes. Of the 18 cases of traumatic laceration treated in this manner, all healed without infection and slight separation of the wound edges occurred in only three cases. The resulting scar was as satisfactory as that obtained with fine small sutures, an advantage of the method, particularly useful in young children, is that an anæsthetic is not required.

BENZENE POISONING

AN investigation of the symptoms and blood changes in a group of 180 men engaged in the rotogravure printing industry, in which benzene was used, has been carried out by C. O. Oldfelt (*Acta Medica Scandinavica*, **119**, 380). Of the one hundred and eighty men examined, thirty-eight were found to be suffering from chronic benzene poisoning; in sixty-one there was a history of acute poisoning, and in the remaining eighty-one no objective symptoms of benzene poisoning were found. The symptoms of the chronic form of benzene poisoning vary greatly, and there are few characteristic features, so that the diagnosis depends largely upon examination of the blood. In the recorded series a diagnosis of chronic benzene poisoning was made when the blood picture showed definite leucopenia or thrombocytopenia. When these conditions are combined with one another or with anæmia the diagnosis is not difficult, but considerable difficulty arises when anæmia is the only abnormal feature present. Of the thirty-eight patients in whom chronic poisoning was diagnosed, examination of the blood showed anæmia plus leucopenia and thrombocytopenia in ten; anæmia and leucopenia in twelve; anæmia and thrombocytopenia in one; anæmia alone in two; and leucopenia alone in thirteen. Sternal puncture was carried out in six cases; the specimens were rich in cells, showing that no aplastic anæmia had had time to develop. The most common subjective symptoms of benzene poisoning are fatigue, headache, vertigo, nervousness, insomnia, and gastro-intestinal disturbances, such symptoms being present in both chronic and acute forms. In about one-fourth of the cases diagnosed as chronic poisoning, however, the patients did not complain of any symptoms. A table showing age incidence indicates the highest figure for chronic poisoning in the age-groups 30–50. All cases of poisoning, except one, occurred in men who had been exposed to benzene for more than one year. One death occurred: the man, having been examined and the blood picture found normal four months previously, fell ill with gingivitis and died from agranulocytosis. Treatment consists chiefly in removing the patient for some length of time from risk of exposure. Iron and liver preparations were administered, and in six cases blood transfusions. Although liver therapy did not cause any noticeable improvement in the blood picture, the patients stated that they felt better for it.

PENICILLIN AND RHEUMATOID ARTHRITIS

A REPORT from the U.S. Army Rheumatism Centre indicates that penicillin is of no avail in the treatment of rheumatoid arthritis. Major E. W. Bolandt, Captain N. E. Headley, and Lt. Col. P. S. Hench, of the U.S. Army Medical Corps (*Proceedings of the Staff Meetings of the Mayo Clinic*, October 18, 1944, **19**, 505) used penicillin in the treatment of ten soldiers with early but progressive rheumatoid arthritis. Large doses were given intramuscularly every three hours, the daily dosage varying from 120,000 to 320,000 Oxford units, whilst total dosage, given within a period of 14–20 days, ranged from 1,800,000 to 3,250,000 units. In

spite of these large doses there was no definite evidence of improvement in any of the patients investigated, either clinically or as judged by laboratory tests; sedimentation rates and comparative leucocyte counts on synovial fluid remained practically unaltered. In two patients there was some slight subjective or objective improvement, but this was no more marked than would be expected in the natural history of the disease. In view of their findings the authors recommend that until much larger supplies are available, penicillin should not be used in the treatment of this condition.

CALCIUM THIOSULPHATE IN THE TREATMENT OF PULMONARY TUBERCULOSIS

THE importance of calcium in the treatment of pulmonary tuberculosis owes much to the French school for its elucidation; these investigators have noted a marked calcium deficiency in tuberculous subjects. In an article by Wolff (*Zeitschrift für Tuberkulose*, 1943, **90**, 107; Abst. *Praxis*, July 27, 1944, **33**, 534) mention is made of the neutralizing action of thiosulphate on bacterial toxin, and the consequent stimulation of the protective mechanism of the organism. The author has used a 10 per cent. aqueous solution of calcium thiosulphate (Schering), the calcium content of which is stated to be 70 per cent. higher than in other calcium gluconate compounds, and a markedly raised blood calcium level of superior height and duration is stated to follow intravenous administration. The dosage employed was at least 20 intravenous injections of 10 c.cm. daily, and, if necessary, a repeat course of 10 to 20 injections after two to three weeks' interval. This procedure resulted in a marked amelioration of the symptoms of hyperexcitability, night sweats, palpitation, vasomotor and gastrointestinal disturbances, loss of appetite, exhaustion and other toxic phenomena, after a few injections in cases of pulmonary tuberculosis. In exudative pleuritis, in which condition the drug was introduced into the pleural cavity (15 c.cm., followed by injections of 10 c.cm., the procedure being repeated twice or three times at three- to five- day intervals, if necessary), a marked shortening of the course of the illness was noted. The exudative process was checked, and usually ceased after two or three injections.

THE SUBLINGUAL ABSORPTION OF PROGESTERONE

As a result of his observations in sixty-eight patients, R. B. Greenblatt (*Journal of Clinical Endocrinology*, July 1944, **4**, 321) is of the opinion that satisfactory absorption of progesterone and anhydrohydroxyprogesterone takes place through the buccal mucosa. The "linguets" used for this purpose were made in the form of hard pressed, slowly soluble tablets, which contained either 5 mgm. of anhydrohydroxyprogesterone, or 2·5 or 5 mgm. of progesterone. Four to ten linguets were given daily for three to ten days. The criteria adopted for effective absorption were:—(1) The induction of "progesterone withdrawal bleeding" in patients with amenorrhœa; (2) the effective arrest of menorrhagia six to ten days after withdrawal of the drug; (3) the clinical results obtained in patients with mastodynia, premenstrual tension, and dysmenorrhœa. Withdrawal bleeding occurred in 74 per cent. of those treated with anhydrohydroxyprogesterone, compared with 55 per cent. of those treated with progesterone. It is suggested that the poorer results with the latter are due to some of the progesterone being swallowed and thereby rendered inactive.

APPENDICITIS IN PREGNANCY

APPENDICITIS is not a common complication of pregnancy, but, as B. Johnson (*Medical Journal of Australia*, October 7, 1944, **31**, 379) points out in a review of the subject, the difficulty of diagnosing it during pregnancy and its potential danger render it a subject of considerable importance. Primary acute appendicitis is rare during pregnancy, but pregnancy may be responsible for an acute exacerbation of chronic appendicitis by virtue of the enlarging uterus stretching kinks and previously formed adhesions: a process which encourages an inflammatory reaction. For this reason appendicitis is most common in the second trimester of pregnancy. On account of the altered position of the abdominal viscera during pregnancy the usual signs of appendicitis may be wanting. During the second trimester the most important differential diagnosis is right-sided pyelitis, and in this connexion it has to be borne in mind that culture of the urine may be misleading; Johnson reports the finding of *B. coli* in the urine in sixteen out of thirty-four pregnant patients with appendicitis. The course of appendicitis in pregnancy is rapid and perforation may occur within a few hours. It is recommended that operation should be performed in cases of doubt when the patient's general condition is grave. The maternal prognosis is good with early operation, but if perforation has occurred the mortality rate in late pregnancy is 50 per cent. In early cases there is little risk of abortion but, after perforation, abortion will occur in about half the cases. In the last two months of pregnancy perforation is extremely dangerous, and Cæsarean section followed by appendicectomy is recommended as the procedure most likely to give good results.

REVIEWS OF BOOKS

he Management of Neurosyphilis. By
BERNHARD DATTNER, M.D., JUR. D. Fore-
word by J. E. MOORE, M.D. London:
William Heinemann (Medical Books)
Ltd., 1944. Pp. 398. Price 25s.

'HIS book is largely inspired by the pioneer
ork of the late Prof. Wagner-Jauregg, with
hom the author worked in Vienna for many
ears before settling in New York. Convinced
f the paramount value of changes in the
erebrospinal fluid as a guide to treatment,
)r. Dattner devotes practically the first hundred
ages of the book to one of the most detailed
xpositions of the technique of withdrawal and
xamination of cerebrospinal fluid that has
ppeared in the English language. No detail of
echnique is too small to be overlooked, and this
ection includes an equally detailed discussion
)f the cerebrospinal fluid changes in the
lifferent forms of neurosyphilis. The second
)art of the book gives a critical and full survey
)f the many methods of treatment of neuro-
syphilis, ending with a chapter on the prophyl-
axis and pathogenesis of parenchymatous
neurosyphilis. Naturally, in view of his associa-
tion with Wagner-Jauregg, the author gives
malarial therapy priority in the treatment of
general paralysis of the insane, but he never
allows his enthusiasm for this form of treatment
to bias his opinion concerning other forms of
'therapy; all are fully and carefully discussed,
and care is taken always to give reasons why
certain forms of treatment are preferred to
others. The whole book is carefully docu-
mented, and the bibliography itself is of con-
siderable value. Needless to say, every neuro-
logist and venereologist will not accept the
author's teaching in its entirety—for instance on
the question of the superiority of malarial blood
over infected mosquitoes in the infecting of
patients with malaria—but none of them will fail
to learn something of value from its pages, and
all will find the book a valuable guide to the
intricacies of the treatment of neurosyphilis.

Lipreading and Hearing Aids. By IRENE R.
EWING, O.B.E., M.Sc. Manchester:
University Press, 1944. Pp. vi and 73.
Price 4s. 6d.

THE writer's own disability has given her an
intimate knowledge of the practical and psycho-
logical problems which confront the deaf
person, and this practical experience has been
utilized to the full in this admirable little book.
Originally written as a guide to those proposing
to practise the teaching of lipreading, the scope
has been widened to include some most helpful
advice on the subject of hearing aids. The book

is written with such admirable simplicity that
its meaning is perfectly clear, even to those
without any scientific training. Apart from its
value to prospective teachers of lipreading it is
a book which can be recommended to any deaf
person as a preliminary to taking up a course of
lipreading or the purchase of a hearing aid. In
view of the fact that the author recommends
that pupils should be encouraged to read all
available literature about lipreading, it is per-
missible to suggest that a bibliography would
form a useful extra appendix.

Deep Massage and Manipulation Illustrated.
By JAMES CYRIAX, M.D., B.CH. London:
Hamish Hamilton Medical Books, 1944.
Pp. 242. Illustrations 98. Price 15s.

THIS handsomely produced book, almost pre-
war in its standard of production, is an excellent
example of the pictorial method of teaching.
With the aid of almost one hundred photo-
graphs the author has demonstrated the methods
whereby deep massage may be used for the
treatment of conditions ranging from tennis-
elbow to duodenal spasm. Each photograph is
accompanied by a page of instructions as to how
the treatment is given, its indications and its
duration. In an introductory section the general
principles underlying the use of deep massage
are briefly discussed. Impressed by the necessity
for precise diagnosis, and fully recognizing that
deep massage is only one aspect of physio-
therapy, the author has provided physio-
therapists, both student and qualified, with a
manual which is as outstanding for its clarity
as it is for its sense of balance.

NEW EDITIONS

A NUMBER of new diagrams have been added to
Textbook of Gynæcology, by WILFRED SHAW,
M.D., F.R.C.S., F.R.C.O.G., in its fourth edition
(J. & A. Churchill Ltd., 24s.), and revision and
rewriting have been carried out in many sections.
The new edition contains 271 figures and
4 colour plates, is well produced, and shows
little evidence of war-time restrictions.

THE section dealing with the legal aspects in
Murrell's *What to do in Cases of Poisoning*, by
HAROLD G. BROADBRIDGE, M.B., B.S., has been
rewritten in the preparation of the fifteenth
edition (H. K. Lewis & Co. Ltd., 8s.) and, in
view of the author's position as H.M. Coroner
for the County of Middlesex, Western District,
the information and advice contained therein
should be of considerable value to the practi-
tioner, and particularly to those interested in
forensic medicine. This little book deals in a
practical manner with the different types of
poisoning, their diagnosis and treatment.

NOTES AND PREPARATIONS

ROCHE PRODUCTS LTD.—Notification has been received of the reduction in price of two of this firm's preparations: NICOTINIC ACID TABLETS (50 mgm.) are now issued in packings of 25, 100 and 1000, price 1s. 6d., 4s. 3d. and 37s. 6d. respectively; and NICOTINAMIDE TABLETS (50 mgm.) price 2s. 6d., 7s. 6d. and 36s. for 25, 100 and 500 tablets. The address of the manufacturers is Roche Products Ltd., Broadwater Road, Welwyn Garden City, Herts.

SULPHARSAN (S.L.N.) (Sulpharsphenamine–Evans) is the sodium salt of a methylenesulphurous acid derivative of 3 : 3-diamino-4 : 4'-dihydroxyarsenobenzene. It is issued in sealed ampoules of 0·15 gm., 0·30 gm., 0·45 gm., and 0·60 gm., in boxes of 10. The manufacturers are Evans Sons Lescher & Webb Ltd., Liverpool and London.

WAR-TIME DRUGS

National War Formulary. Alterations and additions to the second edition of the Formulary published in 1943 have been issued in the form of Amendment No. 1 (1945), and will be in force from February 1, 1945. Among the additions are sulphanilamide and sulphathiazole creams for the treatment of burns. A copy of the Amendment can be obtained from H.M. Stationery Office, price 1d. *The Seventh Addendum to the British Pharmacopœia,* 1932, was published on February 1, 1945, and became official from that date. The new monographs include a number of sulphonamide derivatives, in both tablet and soluble forms. A cumulative index is included, and also a list of approved names of drugs, which have been made official in the Addenda. The Addendum is published for the General Medical Council by Constable & Co. Ltd., 10 Orange Street, Leicester Square, London, W.C.2. *National Health Insurance.* New Regulations, entitled the "National Health Insurance (Medical Benefit) Amendment Regulations, 1945," have been made by the Minister of Health, under which chemists are authorized to accept prescriptions on forms provided by Insurance Committees with whom they are not under contract, the claim for payment to be made to the Committee in whose area the place of business is situated.

OFFICIAL NOTICES

Immunization Against Diphtheria. This is the title of a brochure issued by the Ministry of Health, in conjunction with the Central Council for Health Education, dealing with the subject of publicity plans for the diphtheria immunization campaign. The brochure contains samples of leaflets for advertising and other information on propaganda measures, and practitioners who, as stated in the introduction, can play an important part by direct approach, can obtain further information on application to their local Medical Officer of Health. *Health Research in Industry* deals with a conference on industrial health research, held at the London School of Hygiene and Tropical Medicine, in September 1944, at which the chair was taken by Sir Edward Mellanby, K.C.B., M.D., F.R.C.P., F.R.S. Copies can be obtained from H.M. Stationery Office, price 6d.

EMPIRE RHEUMATISM COUNCIL

THE eighth Annual Report of the Empire Rheumatism Council, 1943–44, contains details of research work carried out during the year. In future the *Annals of the Rheumatic Diseases* will be published as a quarterly supplement to the *British Medical Journal,* and a further measure for the spread of knowledge of rheumatic diseases is the inauguration of a Committee on Postgraduate Education under the auspices of the Council.

CONTENTS FOR APRIL, 1945

INTRODUCTION

By the Rt. Hon. LORD LEATHERS, C.H.
Minister of War Transport.

CASUALTIES on the roads of this country before the war had reached the appalling annual total of 250,000. Deaths averaged 6,500; injuries in many cases were so serious as to impose a permanent handicap on the victims. After the war, as traffic increases, the figure will be still higher—unless we act now.

That, in a nutshell, is the problem which a group of expert advisers, under the chairmanship of the Parliamentary Secretary of the Ministry of War Transport, has been investigating for the past twelve months. Their first report is now in my hands and I hope to be able to announce shortly some at least of the Government's proposals for dealing with the situation which will arise when war-time traffic restrictions are relaxed.

I must emphasize, however, that if ever there was a problem that called for a combined effort by all sections of the community, it is the problem of road safety. We are all road-users, and we can all help in some degree to make the roads safer.

If we are frank with ourselves we must admit that during the war we have become more careless. Our traffic sense has become blunted, our road habits slipshod. This is illustrated by the fact that last year road deaths were only slightly less than in the last year of peace, when there were many more vehicles on the road.

No doubt the reasons for the decline in the standard of road conduct are partly psychological. In face of the danger from the air we have tended to rate the danger of the roads too lightly; yet road deaths during the war have totalled more than 30,000, which is about two-thirds of the total resulting from air raids.

Most disturbing of all has been the increased number of accidents to children. Roughly, one-fifth of the victims of road accidents are children, the majority of whom are between the ages of three and eight. From 1930 until the outbreak of war there was a steady improvement, year by year, in child mortality on the roads. In 1930, the total was 1,700, but by 1938 it had fallen to about 1,000. The improvement was maintained until May, 1940, since when the position has deteriorated. In the second year of the war no fewer than 1,500 children lost their lives; in the third war year, 1,300. Although, happily, these peak figures have not persisted, scarcely a month fails to show a record of upwards of 100 young lives lost on the roads.

POST-WAR PLANS

The first necessity after the war will be a stiff refresher course in the rules of the road, particularly as there are now great numbers of untested drivers. In one year alone (1943), half a million provisional or learner licences were issued. In addition, many thousands of Service drivers have had little experience of normal traffic conditions. Should they undergo a test to make sure they are fitted for post-war conditions? If so, shall we have the necessary manpower to instruct and examine them? These are questions to which my Ministry is giving much thought.

It must also be borne in mind that the condition of road vehicles, for some time to come, will leave much to be desired. There will be a strong temptation to put vehicles into service before they are thoroughly roadworthy. The highways themselves, although they have stood up remarkably well to heavy military traffic, are showing serious signs of wear and tear. To restore them to pre-war standards it is estimated, an expenditure of £30 to £35 million must be incurred.

Accidents are in part due to the unsuitability of the road system, even though human fallibility is the main factor. Now is the opportunity to replan the road and to review safety propaganda and training. Study of traffic density has shown that 5 per cent. of the total road mileage carries the greater part of the traffic of the country. Engineers of the Ministry of War Transport are surveying this densely traversed part of the system in order to decide where it will be more economical to build new roads than to try to adapt the old. In addition, we propose to submit to Parliament, as soon as possible, a Bill to authorize the construction of suitable lengths of new "one-purpose" highways to carry fast through traffic.

NEED FOR COORDINATION

The old methods of accident prevention, however useful and necessary, will suffice no longer. A coordinated effort is needed by all who, in an official or private capacity are concerned with roads and road safety. To obtain that effort we must have a comprehensive plan of action which will have the general approval of the country. Within the framework of the plan there must be ample scope for initiative on the part of local authorities, police, education authorities and voluntary organizations. In particular, I hope to see an extensive development of mobile police patrols, and of the various schemes for training children to look after others as well as themselves.

Most fatal accidents involve not the very young or the aged, but men and women in the early twenties, at the height of their physical and mental powers. This is true of both the "killers" and the killed. Obviously therefore our educational programme must aim at imbuing older children not only with the instinct of self-preservation (as in the case of the toddlers with their valuable "kerb drill"), but also with a sense of civic and communal responsibility. For this reason the Royal Society for the Prevention of Accidents, with the full support of the Ministry of War Transport, is inviting the cooperation of the heads of private, preparatory and public schools. In the state-aided schools, valuable work is already being done by the Society, the education authorities, and the police.

Medical practitioners are better fitted than most of us to appreciate the gravity of the problem. They know the suffering, the shattered nerves and unhappiness that accidents bring in their train; and as motorists they are familiar with the dangers of existing road conditions. Their views, as trained observers, must therefore command respect, and the influence they exert in their contacts can be of immense value in securing effective cooperation from the public.

The medical and psychological aspects of accident prevention, discussed so ably in this issue, are of vital importance. I am sure that the achievement of road safety, like the conquest of disease, will be the result, not of some sudden discovery but of long and patient research, of action in a large number of directions, and of the closest cooperation between all those who are able to bring something to bear on the solution of the problem.

MOTOR DRIVING TESTS

BY DOUGLAS J. A. KERR, M.D., D.P.H., F.R.C.P.ED.

*Lecturer in Forensic Medicine, School of Medicine of the Royal Colleges, Edinburgh;
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UNDER the Motor Car Act 1903, it was possible for anyone of seventeen years
age to obtain a driving licence by the payment of five shillings. The Royal
ommission on Transport, 1929, considered the imposition of a medical examina-
on of drivers but decided to recommend against it. The Road Traffic Act, 1930,
owever, instituted a declaration by the applicant for a driving licence, that he
n pass a minimum eyesight test and that he does not suffer from various condi-
ons which would be likely to cause the driving by him of a motor vehicle to be
source of danger to the public.

PRACTICAL TESTS

nder the Road Traffic Act, 1934, all new applicants must pass a practical test
their competence to drive. This is the present position in Great Britain, the
nderlying idea being that road accidents, so far as they are contributed to by
ivers, are due to lack of training and experience in driving rather than to medical
" - " to drive. It is noteworthy, however, that under the Acts the driver of
public service vehicle has to pass a medical examination as to his fitness to drive,
esumably on account of the safety of his passengers, but there does not seem
be much difference in the danger to the bus passengers, whether a bus runs
to a lorry or a lorry runs into a bus. In the practical test the applicant must
tisfy the examiner that he is able to start the engine unaided, move away ahead
at an angle, overtake, meet other vehicles, turn corners correctly and stop the
hicle normally or in an emergency, drive the vehicle backwards, enter a limited
pening, and show that he is capable of driving a vehicle without danger to others.
this test of competence nearly one-third of the applicants fail—an indication
f its necessity and of the risk to public safety previously run. With this object
sson as basis, the value of the "declaration of fitness" made by the applicant
or a driving licence, which is the substitute for a medical examination, will now
e examined.

THE DECLARATION OF FITNESS

n the declaration there are four questions of a medical nature, numbers 11, 12,
3 and 14.

QUESTION 11.—*Do you suffer from epilepsy, or from sudden attacks of disabling
giddiness or fainting?*

All drivers I examine for employment are requested to fill up a declaration as
o their medical condition and previous medical history. One of the questions is
imilar to this question. During the writing of this article two applicants holding
icences, who had been accepted for employment, were referred back, one as he
ad a fainting turn on a bus, the other as his previous employer, hearing he had
been engaged, wrote to the manager stating the man was an epileptic. Both had

answered "No" to this question. Since writing the above, a third recently employed driver has been discharged, his previous employer stating that he was discharged by him after producing a certificate from his family practitioner saying that he suffered from epilepsy. He also had answered "No" to this question.

QUESTION 12.—*Can you read at a distance of 25 yards in good daylight (with glasses if worn) a motor car number plate containing six letters and figures?*

. This standard is equal to a visual acuity of 6/15. It is well known that people with defective eyesight may be unaware of it, and few, if any, on reading this question are going to test their vision to see if they comply. Examiners are frequently told by candidates for employment as drivers, when about to test their vision, that they have always had good sight, only to find that their visual acuity is 6/24 or even 6/36; yet they are in possession of a driving licence, having signed the required declaration. On one occasion I examined a tractor driver who was actually employed driving a tractor through city streets, and found that he failed to read 6/60. One large American company in 1930 examined 15,343 men for drivers and rejected 40 per cent. for various physical defects, 35 per cent being rejected for defective vision alone (Vernon, 1936). Personal experience is quite conclusive, i.e., that the declaration of fitness is of no value in ensuring that all drivers have adequate visual acuity.

QUESTION 13.—*Are you without either hand or foot, or are you suffering from any defect in movement, control, or muscular power, of either arm or leg?*

This question was asked before the driving test was instituted by the 1934 Act It still leaves the question of potential incapacity to be decided by a layman.

QUESTION 14.—*Are you suffering from any other disease, mental or physical, or disability which would be likely to cause the driving by you of a motor vehicle to be a source of danger to the public?*

How many patients are aware of the full extent of any disease from which they suffer and of its implications and possible dangers? I quote, as example, two cases recently examined:—

One, a man with a high blood pressure, who had already had a cerebral hæmorrhage from which he had made a good recovery, was sent for examination by the licensing Authority as his relatives had complained about his having been granted a licence. The other had advanced arteriosclerosis and complete heart block. They were both driving and considered themselves fit to drive.

Again, cases can be recalled in which drivers charged with careless or reckless driving have actually pled in their defence that they suffered from neurasthenia and became easily excited in an emergency.

As regards mental conditions, Selling (1940) reported the psychological findings in 500 traffic offenders and accident-prone drivers referred by the Recorder's Court for examination: 36 per cent. were found to be feeble-minded (I.Q. below 70). He concludes that the problem of the mental defective, neurotic and psychotic driver is a serious one; they can be detected and diagnosed, and in most cases should be removed from the highway. Amongst mental conditions personally found in drivers were mental defect, schizophrenia, a case of brain tumour and one post-encephalitic. Individuals suffering from mental conditions do not usually consider themselves unfit to drive.

Out of the last 200 applicants examined for employment as bus drivers—candidates who had been selected by experienced lay officials out of a much larger number of applicants—36 were rejected as unfit. Among these rejections nine were unfit to drive any motor vehicle and several others were borderline, yet all these rejects considered themselves fit to drive, not only a light private car for pleasure but a heavy bus through busy city streets under all weather conditions.

Such a questionnaire will no doubt exclude the conscientious unfit driver who, he were granted a licence, would be so aware of his limitations that he would drive with caution in the knowledge that he might be a danger, whilst it will fail to detect those who, through ignorance or design, do not disclose their incapacity. It must be evident that there are many drivers holding a licence who are physically or mentally unfit to drive.

PREVENTIVE MEASURES

In this country no steps are being taken to remedy this state of affairs, either by eliminating the totally unfit or by treating and re-educating those capable of becoming safe drivers. It is all very well to fine a reckless driver or determine in a Court who is to blame for an accident, but this is not going to prevent a re-occurrence if the offence is due to a medical defect or bad habit of which the driver himself may be ignorant. No doubt this lack of action may be attributed to the prevalent idea that unfit drivers are not responsible to any great extent for accidents. In an address before the National Safety Congress (Bristow, 1938) a speaker stated that only ·05 per cent. of fatal accidents and 0·02 per cent. of non-fatal accidents were attributable to drivers being physically defective, and from this suggested that voluntary declaration of fitness should be continued and a medical examination should not be imposed. Such statistics are quite fallacious as, except in special circumstances, the driver of a vehicle involved in an accident is not examined, even if he is to blame for the accident, and it is only when he has some physical defect, such as an obvious artificial limb which is evident to the police constable making the report, that his disability is recognized and reported. In this connexion it is interesting to note that the rejects out of the 200 applicants for bus driving referred to above had all been selected by experienced lay officials as suitable for employment as drivers. Until all drivers involved in accidents, or who appear before a Court charged with a driving offence, are examined, it is not possible to determine to what extent the medical condition of drivers contributes to the total of road accidents. In Detroit, a special clinic was set up to deal with traffic offenders, with excellent results (Selling, 1940). De Silva et al. (1939), from a voluntary clinic for accident-prone drivers in New York, report good cooperation and that offenders often sent their friends, and conclude that lack of training and medical defects were the cause of dangerous driving. The examination, as to their medical fitness, competence, and knowledge of the correct manner of driving, of drivers appearing before a Court charged with driving offences, is a step which should be taken in an effort to reduce the number of careless or reckless drivers. Such an examination is not solely to eliminate the unfit, but also to treat or re-educate offending drivers by bringing to their notice some medical defect or bad driving habit of which they themselves are probably ignorant. Quinan (1931), in San Francisco, examined 1,000 traffic offenders charged with reckless driving; his

records of their ages are interesting and demonstrate that a reckless driver capable of becoming a safe driver.

AGE DISTRIBUTION OF 1000 RECKLESS DRIVERS (Quinan)

Age in years	Under 19	19 to 25	30	35	40	45	50	55	60	65	7
Offenders	14	239	221	166	95	80	46	36	14	8	

Tests.—Numerous tests have been proposed with the object of determini: whether an individual is likely to be a safe driver or not. The National Institu of Industrial Psychology devised a group of tests for motor car drivers (*Lanc* 1934) consisting of a series of psycho-physical tests, such as reaction time, resistan to distraction, vigilance, vision, coordination, judgement of relative size, spatial relationships and speed, and a performance test consisting of driving stationary car whilst a projector throws a moving landscape on a screen; by movi the controls the examinee guides the car over the road on the screen. The wh testing takes about an hour.

Psychological tests have been used from time to time by various private or pub companies with the object of selecting good drivers and so reducing their accide rate. Such tests applied to Paris omnibus drivers *reduced* the number of accide by 66 per cent. between 1929 and 1933, although the number of buses increas by 77 per cent. The total number of motor vehicles only increased by 33 F cent., but the total accidents *increased* by 5 per cent. during the same peri (Myers, 1935). The Yellow Cab Company, Chicago, tested their drivers and fou those classed as unsatisfactory at the tests had twice as many accidents as t satisfactory group (Vernon, 1936). A Chauffeur Company at Pittsburgh, a another in Barcelona, obtained similar results. Such tests are suitable for selecti good drivers for employment and so reducing accidents and running costs, b are too drastic for general application to applicants for a driving licence.

Training.—So far as drivers are concerned, examination of employees and traffic offenders shows that the two main factors which contribute to acciden are lack of proper training and medical defects. Both are important. It will l generally agreed that the average public service bus driver shows a high standa: of safe driving, and it is a striking fact, which indicates the way in which th problem should be tackled and what tests a new driver should undergo in tl future, that in the selection of these drivers great attention is paid to both the points. Not only do bus drivers receive a thorough and careful training l competent instructors but they are required by law to produce a medical certifica: of their fitness to drive. There does not seem to be any reason why similar requir ments should not apply to the private or ordinary licence holder, many of whor are driving vehicles for business purposes in all weathers. Such requiremen: for private drivers are in force in other countries. An attempt to obtain prope training has been made by the introduction of the test of competence to driv which all new applicants now have to pass, and the percentage of failures at thi test has indicated the necessity for it. Most candidates at such an examinatio can be cautious and on their best behaviour; and what is of more importanc than the passing of such an elementary test is that the trainee driver should hav a good basic training, so that good driving becomes automatic to him. This ca

ily be acquired by correct training by competent teachers. Many a bad driver ves his bad driving, of which he himself is probably quite unaware, to having :en taught by a friend who himself is a bad driver: that is, he has not only been · ,y taught but has actually been *taught* to drive badly. The remedy would 1pear to be to require all new applicants for a licence to undergo a course of aining given by an approved instructor. This is quite feasible and was in force some countries before the war (Foley, 1933).

MEDICAL EXAMINATION

s regards the medical examination, at the present time all applicants for licence drive a public service vehicle, in addition to being twenty-one years of age and oducing evidence of character, have to produce a medical certificate from some edical practitioner, usually their own, stating that the practitioner is of opinion at the applicant is fit to drive a public service vehicle. The practitioner has also answer the following questions:—

(1) Is the applicant, to the best of your judgement, subject to epilepsy, vertigo, or any mental ailment likely to interfere with the efficient discharge of his duties as a driver of a public service vehicle?

(2) Has the applicant any deformity, loss of members or physical disability likely to interfere with the efficient discharge of his duties as a driver of a public service vehicle? (Special attention should be paid to the condition of the arms, hands, and joints.)

(3) Does the applicant suffer from any heart or lung disorder likely to interfere with the efficient discharge of his duties as a driver of a public service vehicle?

(4) (a) Acuity of vision (with glasses if worn) by Snellen's test type.
　　(b) Were the readings taken with the applicant's own glasses?
　　(c) Is the applicant's field of vision by hand test satisfactory?
　　(d) Do you consider that the applicant's vision is such as to be likely to cause the driving by him of a public service vehicle to be a source of danger to the public? (This question need only be answered if the acuity, with glasses if worn, is below 6/12 with one eye and 6/36 with the other eye, or if the field of vision is unsatisfactory.)
　　(e) Is there any serious defect of hearing?

(5) Does the applicant show any evidence of addiction to the excessive consumption of alcohol, tobacco or drugs?

(6) Does the applicant appear to be suffering from any other disease or physical disability likely to interfere with the efficient discharge of his duties as a driver or to cause the driving by him of a public service vehicle to be a source of danger to the public?

Visual acuity.—This certificate includes the important points regarding vision nitted in the "declaration of fitness" at present made by the applicants for an rdinary licence, and as it is given by the applicant's family practitioner in most ises, the position regarding epilepsy and mental conditions is made more satis- ictory. The visual acuity required is 6/12 in the better eye and not less than /36 in the other eye, and corresponds to the requirements in Germany (Harman, 937) and those recommended by the American Medical Association (1938). inocular vision is required and, whilst it is possible to drive with one eye, the eneral concensus of opinion favours this requirement. Schwarz (1940), who carried ut the official examination of applicants for a driving licence in Switzerland, eviewed, after ten years, the accidents involving one-eyed drivers. He found a high icidence of collisions on crossings, often on the side away from the defective eye, he driver apparently turning his head to compensate for the loss of field of vision n his blind side. He concluded that in certain situations a one-eyed driver ndangers the safety of motor traffic.

The certificate also requires a rough test of the *field of vision*. Although infrequent defect, it is of more importance than visual acuity. Harman (193 has emphasized that without a sufficient field of vision the sharpest visual acui is useless; that persons reading 6/9 may, by reason of extreme limitation of t field of vision, have to be led about. With a loss of 20 per cent., persons are liat to bump into objects and other people, and he considers that such a limitati would be dangerous in a motor driver. No mention is made of colour vision the certificate and most investigators conclude that this is of little importance regard to safe driving or accidents, the defective driver obtaining a clue to t colour by the relative position of the lights.

General findings.—The other questions do not fix any standard and leave to the medical man to decide, in each individual case, whether the conditio present are of such a nature or degree as to interfere with safe driving. It is these questions that the difference in physique required of a bus driver and priva car driver is taken into account. Keeping this in mind, and looking to the mounti total of road accidents, the large increase in motor traffic to be anticipated, t number of unfit drivers at present holding licences, and the uselessness of voluntary declaration of fitness as at present in force for ordinary licence hold unless enforced by a medical examination, it seems reasonable to suggest, that the interests of public safety, all new applicants for a driving licence should required to produce a certificate similar to that at present in force for drivers public service vehicles.

CONCLUSIONS

(1) There are many individuals holding a driving licence who are unfit to drive.

(2) The present declaration of fitness by an applicant for a driving licence is little value.

(3) Any statistics regarding the responsibility of unfit drivers for accidents in th country are fallacious, as drivers are not examined after an accident.

(4) All drivers involved in serious accidents or charged before a Court with driving offence should have their competence to drive tested and l medically examined.

(5) All new applicants for a licence should produce a certificate of satisfactor training from an approved instructor and a medical certificate similar to th at present in force for drivers of public service vehicles.

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MEDICAL STANDARDS OF FITNESS FOR DRIVING

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HERE are many disabilities which prevent safe driving and others which are of a borderline type. Of the latter, perhaps the most important are those generally termed mental. Recklessness, aggressiveness, wandering of attention, indecision, long reaction time, lack of road sense, and lack of sense, are among them. In theory they should be detected in the driving test. They are often, however, controlled by the discipline of the driving lessons and concomitant self-interest, and so may not be manifested until some collision occurs. Most men have a mild belief that the world can be made a better place by reform of present evils and by preventive legislation. Such legislation may certainly shift the burden from one group to another. The nation to-day is health-conscious and full of plans. The ideal motorist may not yet have been bred, for not until a century's statistics are available will the laws of inheritance of driving-ability be known; by which time the emphasis will have shifted to the aeroplane.

Evidently the mental characteristics which, plus a motor car, make a man a danger to the public weal, are likely to be detected in police courts. Even then, the variables of the accident-phenomenon, including the carelessness of pedestrians and of other motorists, must vitiate true justiciary research. Moreover, all Englishmen are believed to be considerate until proved to be otherwise. Therefore it is well to consider disease of a physical nature first, and later to mention disorders of personality.

THE LOWER LIMBS

(1) *Amputation of both lower limbs* above the knee precludes driving. Amputation of one at that level, compensated by a good, artificial leg, need not do so. Loss of the right limb (used for acceleration and braking) is more serious than the loss of its fellow. Amputation of one leg below the knee, provided a good artificial leg is used, and especially if the right leg (for braking) is intact, permits reasonable motoring. Amputation of both legs below the knees, again provided that good artificial limbs are supplied, is not too great a handicap.

(2) *Stiffness of both hips* excludes a driver on account of the great difficulty he would have in entering the car. Stiffness of one hip, or of both knees, or of both ankles, need not exclude him, if the stiff joints are in good position.

(3) *Paralysis.*—The distribution, degree and extent determine the issue. Of lower motor neurone palsies, for example, foot-drop would not as a rule be too great a disability. Paralysis of the calf muscles, especially of those of the right leg, would be awkward. Bilateral complete paralysis of these muscles prevents adequate control of the clutch, foot brake and accelerator pedals. The gluteus maximus and quadriceps are in the same category as the calf muscles, since they effect the extensor thrust. Myasthenic paralysis, controlled by prostigmin, is not an absolute

contraindication. Paralysis of upper motor neurone type and paralysis agita are contraindications if they are of more than of the mildest degree, and if they a due to a progressive disease. Disseminated sclerosis presents a tricky problem.

Sometimes difficulties arise in estimating the degree of paralysis, as it affec the use of the lower limbs in driving.

I remember well the case of a taximan who had an apparently arrested lateral sclero: probably luetic in origin. The driver had to be examined as to his medical fitness for annual permit. Prolonged questioning and careful examination of the patient were follow by inspection of the cab, an ancient model with powerful hand brake. The patient's upp limbs were normal. Caution for public safety was weighed against the desire for justic if not money, to the man. (This was in the days when hierarchies were not worshipped the temples of Aesculapius.) After much perplexity, the decision to give the old b a further year was taken. A week later I hired a cab. Fortune had it that the taximan w the one who had already taxed judgement. The drive was a triumph of will over a po innervation. Anaximander's thesis of "things rendering reparation to each other for the injustices" seemed to be about to be verified before the due time. However, he got me hospital with safety and I felt that, on the whole, the decision to certify the old man fit continue his work had not yet been proved wrong.

(4) *Loss of kinæsthetic sense* of severe degree and extent renders the legs atavi as in advanced cases of tabes dorsalis, subacute combined degeneration or pol neuritis. If the disease is progressive, as tabes often is, driving is not usual permissible. If there is prospect of improvement, as in cases of polyneuritis an many cases of subacute combined degeneration, the decision should be postpone

(5) *Incoordination of the leg movements* without sensory loss should, if sever or if progressive, be regarded as a dangerous disability. That produced by th ponto-cerebellar lesions of disseminated sclerosis is an example. Cases of othe cerebellar lesions, notably tumour, should be reviewed after treatment. Th dysfunction caused by operative removal of the cerebellum, or of part of it, ma in time be well compensated.

(6) *Loss of pressure sense of the sole*, and particularly that of the right foot is a severe handicap. Control of the accelerator pedal is thereby rendered inaccurate. A recommendation of fitness to drive should be granted only if the prospective driver is able to demonstrate on an actual vehicle that he can control acceleration and deceleration.

(7) *Tremors of the feet* need not preclude driving. Gross intention tremor is, however, too great a disability to permit of accurate control of the accelerator.

THE UPPER LIMBS

(1) *Amputation of the right upper limb* near the shoulder excludes the candidate. Signalling is not possible, should the mechanical indicator fail. Loss of the left upper limb is less important than absence of its fellow. The disability in gear-changing which is thereby caused can be avoided by means of the pre-selective gear box.

(2) *Stiffness of the right shoulder* is a severe handicap. If it is gross enough to prevent proper signalling, it should exclude the candidate until such time as it is remedied by treatment.

(3) *The lesser degrees of paralysis* and of incoordination of the upper limbs are not of great importance; the controls which the upper limbs have to work are relatively gross and require no great power to manipulate them as compared with

the accelerator and foot brake, even if the last-named is hydraulic.   Paralysis of the right shoulder muscles is, however, important, in that it prevents signalling.

THE TRUNK

Abnormalities of the trunk need not be discussed here.   If no other disability is present, and the weakness or other disorder permits of walking, then driving will also be possible.

The neck.—Stiffness of the neck, especially for rotation at the atlanto-axial joint, is a severe handicap in reversing.

VISION

Points to be considered are:—

> (1) The visual acuity.
> (2) The visual fields.
> (3) Binocular vision.
> (4) Stereoscopic vision.
> (5) Colour vision.
> (6) Scotopic vision.
> (7) Visual attention.

(1) The *visual acuity* should be at least of the standard mentioned in the official form.

(2) The *visual fields* should be full, otherwise transversely approaching objects (and subjects) will be seen too late to be avoided.

(3) *Binocular vision.*—The driver who has one eye only, or who can use only one eye at a time because of concomitant strabismus or other cause, finds the estimation of distances difficult.   It is true that some men thus hampered by monocular vision are able to drive.   Nevertheless, binocular vision should be regarded as essential.

(4) *Stereoscopic vision.*—Plane binocular vision has several advantages over monocular, such as range and attention.   It is probably adequate for most driving needs. Stereoscopic vision is, however, still more useful. It may be absent (when plane binocular vision is present) for various reasons.   These include partial restoration of binocular function after operation for squint and congenital defects and injury of the angular gyri. Stereoscopic vision is probably necessary for town driving. It is necessary for the drivers of large vehicles, especially when the position of an invisible near front mudguard has to be gauged by a knob projected up from it by a rod.

(5) *Colour vision* is chiefly important for recognition of traffic lights. The standard order of the red, yellow and green from above downwards, allows most alert drivers to overcome the common defect of red-green blindness.

(6) *Scotopic vision* depends upon various factors. If it is impaired by avitaminosis, this can be corrected. Often, however, the defect results from disease involving the rods and their neurones, or from maldevelopment.   In such cases little can be done and "dim-out" driving should be prohibited.   It is then possible to drive in a good light only.

(7) *Visual attention.*—Certain cerebral lesions and maldevelopments may produce the symptom called visual inattention. The movements of objects are not quickly noted. Its implications for safe motoring are obvious.

HEARING

Many deaf drivers are efficient. They have to rely, of course upon sight. In pulli
out from a stationary position by the kerb, most drivers have a momentary bli
spot due to the structure of cars and orientation of the mirror. The deaf dri
may not hear the "toot" of an overtaking vehicle. If he is wise, he will, of cour
look round before joining the potentially lethal stream.

LABYRINTHINE VERTIGO

This offers a difficult problem. If it is severe and intractable, it contraindica
driving. If amenable to treatment, it need not do so.

ATTACKS OF UNCONSCIOUSNESS

The Stokes-Adams' syndrome, epilepsy and other conditions liable to cause sudd
coma, interdict driving. A special problem is that of the diabetic treated by insul
No absolute rule can be made, but it is useful to remember that although a minor
of adults react to a small overdose by abrupt coma, this is exceptional, and th
premonitory symptoms occur. In cases of diabetes of long duration, howev
the dose of insulin is often large. Further, long-continued insulin treatment ten
to modify the effects of an overdose. Patients who in the early days reacted gradua
may now respond by an abrupt descent into coma. The use of zinc protami
insulin also makes the onset of the coma due to overdosage, sudden. In no
other than medicine have serious decisions to be taken on so little decisive eviden

ALCOHOLISM AND DRUGS

The conscientious motorist will do well to exclude Bacchus from his drivi
occasions. At best this god is a trifle "phoney," save in ceremonies.

The chronic alcoholic is a risky motorist. Unless he is curable, he should n
be allowed to join in the attack on road safety.

A proportion of cases of alcoholism are due to epilepsy, often of a larval typ
In such, which number perhaps 10 per cent. of all severe alcoholics, phenyto
may readjust the mental stability and allow the habit to be overcome.

Drug habits may be severe enough to warrant prohibition of driving. Dang
may arise from cocainism through its resulting recklessness or from heroinis
and morphinism by mental confusion.

PSYCHOSES

These in their severe degrees soon become apparent. The lesser degrees often escap
detection. Hypomania, with its recklessness and feelings of power and grandeur
may lead to undue risks being taken. On the other hand, alertness and quicknes
of reaction partly compensate for this. Schizophrenia may cause trouble. Echo
praxia, grandeur, and withdrawal into phantasy, have obvious risks. Poverty o
affect may likewise lead to lack of responsibility.

The organic psychoses, notably general paresis, preclude driving until at leas
a year after they have been cured—when cure is possible. A patient elated by earl
general paralysis of the insane obtained his cure *via* a magistrate's trial. One o
the presenting symptoms was the pursuit by the patient in his car (now forward,
now in reverse) of a police officer!

ALCOHOL AND ROAD ACCIDENTS

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THE action of alcohol on the human organism has been the subject of considerable scientific and lay study for many years; and this interest has produced a large volume of literature based on clinical observation and experimental investigation. Within recent years the appalling increase in road accidents has led to more intensive investigation into the influence of alcohol in the causation of these accidents.

Although it is generally considered that the ingestion of alcohol does have a definite influence on the incidence of road accidents, there are more opinions than real evidence about the extent of that influence, and the question arises whether or not it is a factor of sufficient importance to warrant legislation of a specialized nature to combat it. The driving of a motor car brings into play a number of complicated coordinated actions in neuromuscular control, and presumably anything which diminishes the speed of reaction, lowers the general control, or interferes with judgement, is a potential danger. Does alcohol interfere with these essentials, and, if so, at what stage of inebriation and to what extent? Is the driver who drinks more liable to be involved in road accidents than a driver who does not, irrespective of other factors? If he is, then there is obviously a problem of public safety to be considered.

STATISTICAL EVIDENCE

First, it is well to consider the extent of the problem by perusal of the official statistics of accidents in which alcohol has played a part.

The 1936/37 Ministry of Transport Report on "Road Accidents in Great Britain involving Personal Injury" gives an analysis of accidents according to the primary or proximate attributed cause as follows:—

Road-user	No. of Accidents in which the sole or main cause was held to be "under the influence of drink or drugs"		Total number of Accidents	
	Fatal	Non-fatal	Fatal	Non-fatal
Drivers	25	542	2,124	64,858
Pedal cyclists	9	197	1,051	44,317
Pedestrians	32	502	2,470	58,145
	66	1,241	5,645	167,320

Here it can be seen that in 1936–37 there were 172,965 accidents involving drivers, cyclists and pedestrians, out of which 1,307 (0·8 per cent.) were attributed to the effect of alcohol in either the driver or the pedestrian, and 567 (0·3 per cent.)

in which the driver was under the influence òf drink. Further, if *fatal* accidents in which the drivers of vehicles were under the influence of alcohol are considered, it is found that the official statistics show that there were only 25 such cases in Great Britain for the year, that is to say, about two cases per month.

These are small percentages, and they will cause surprise to most readers, who might reasonably have supposed from casual reading that the "drunken motorist," so-called, was involved in thousands of cases of injury to the person.

FIG. 1.

If this were the whole story it would suggest that the problem was not of serious dimensions, but it is, of course, not the whole story, and there is every reason to believe that intemperance was almost certainly a contributory cause in a number of other cases. The 1933 Report on fatal accidents indicates that it was a contributory cause half as many times as it was the sole or main cause, and police records for 1934 show that 2,016 drivers were certified by the examining medical officer to be under the influence of drink, although it is not suggested that these drivers were all involved in accidents. It is always a difficult matter to obtain reliable evidence in these cases, and quite often when a medical examination is made, it is made sufficiently long after the accident for the effects of alcohol to have greatly diminished. It is also important to keep in mind that a clinical examination can lead to a positive diagnosis only in cases in which the effect of alcohol is pronounced. There is no way of ascertaining that a small, although possibly dangerous, amount has been imbibed, by any ordinary clinical test.

However, it is of interest to ascertain what information can be obtained from a scrutiny of the official statistics showing the distribution of accidents according to the hour of the day, day of the week, the season, and holidays. A good deal of importance has been ascribed to these figures by some investigators, and certain inferences have been drawn which scarcely appear to be justified. One of the main difficulties lies in the fact that the statistics themselves are not well designed for the purpose in view. For example, it is of little use going into detail about the

:cidents at a given time of day if the concentration of traffic at that particular
me is not known, and, moreover, there are many contributory factors in every
`ent about which no record is obtained at all. Can any connexion be inferred
etween these accidents and alcoholic intoxication or can they help to solve the
roblem in any way? Graphs (fig. 1 to 4) have been prepared from the statistics
f the Ministry of Transport Report (1936–37). They show that there are four
iain peaks. For week-days the first occurs between 7 and 9 a.m., the second
etween 12 noon and 2 p.m., the third and highest between 5 and 6 p.m. and
i. fourth between 10 and 11 p.m.
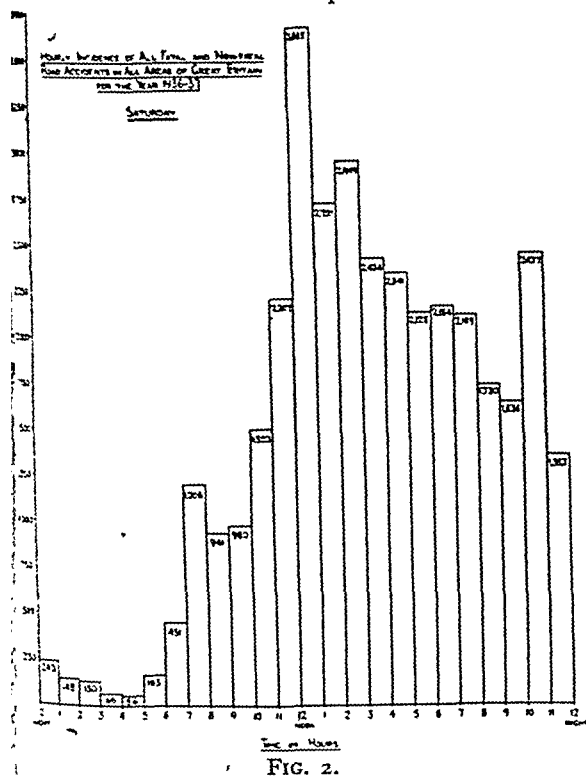
FIG. 2.

The relationship of this hour-to-hour incidence of accidents to the consumption of alcohol is largely conjectural. The peak between 7 and 9 a.m. is undoubtedly due to the increased use of the roads by people getting to work, and the second peak between 12 noon and 1 p.m. is due probably to increased lunch-time movement of traffic. Although alcohol is available for public consumption at this time it is unlikely that there is much intoxication. Similarly, the peak between 5 and 6 p.m. is due probably to increased traffic owing to people returning home from work. Pleasure-
ieeking after work accounts for increased consumption of alcohol in the evening,
'specially on holidays; and it is observed that road accidents follow the same
.ncrease. For week-days, however, the 10 to 11 p.m. peak is of about the same level
Is that seen between 7 to 9 a.m. More significant, perhaps, is the Saturday and
bank holiday increase between 10 and 11 p.m. (fig. 2 and 3), just after the closing
lime of most public houses. However tempting it may be to correlate these facts,
it must be recognized that, in addition to public houses, cinemas, theatres and most
other places of amusement release their patrons about this time and the roads will
be bustling again with people homeward bound. A similar increase on Sunday night
between 10 and 11 (fig. 4), however, cannot be due to this. Vernon (1941), quoting
the figures of the Royal Society for the Prevention of Accidents, shows that between
September and December, 1940, of 1,124 adult pedestrians killed, nearly 100

suffered shortly after they had come out of a public house. The fact of passing from brightly lit conditions into partial or complete darkness must be realized. The period before adaptation to the darkness, and, in fact, the darkness itself, may contribute considerably to the incidence of accidents in the evening. Thus, although the consumption of alcohol and the incidence of road accidents both increase in the evening, many other factors are involved, and an increase in the number of accidents at any given time of the day may mean that there are more drunken motorists on the road or merely that there are more motorists or more pedestrians, and any attempt to quote these statistics in support of any theory without due regard to the many modifying influences must be regarded as improper.

FIG. 3.

It is therefore obvious that perusal of the official statistics does not make it possible to pronounce an opinion of any value with reference to the importance of alcohol in promoting road accidents. It is, on the other hand, a matter of common knowledge that drunkenness leads to loss of control which at some stage must of necessity render the drinker liable to accident, if a driver, or liable to be run into, if a pedestrian. Thus the effect of alcohol on the human organism must be
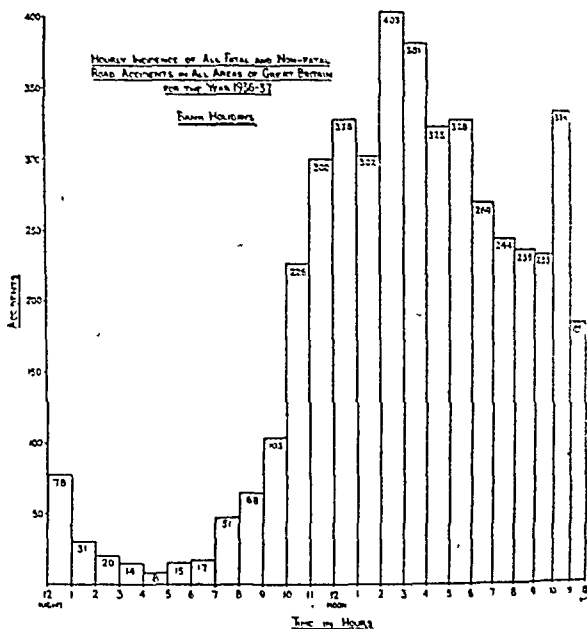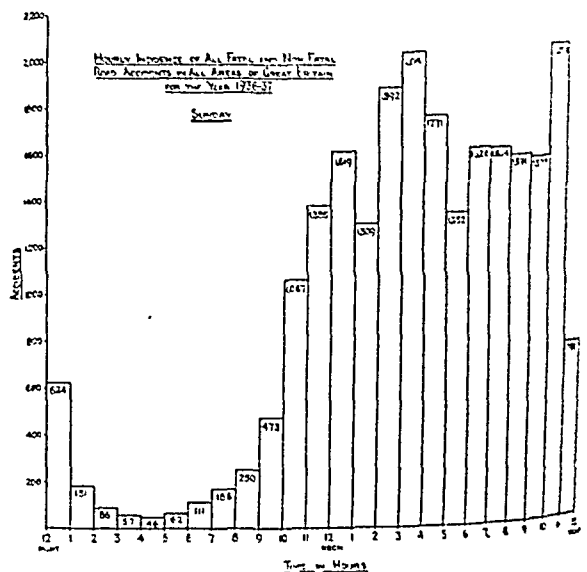
FIG. 4.

considered with the object of ascertaining if from such study any helpful conclusion can be drawn.

ESTIMATION OF ALCOHOLIC INTOXICATION

Although the effect of alcohol in large quantities is perfectly well known and understood, and no person in his sane senses would suggest that the ingestion of large quantities of alcohol is anything but a danger, it is not known whether, or at what stage, small quantities of alcohol so affect a person that he is likely to become a danger to the public. There is no hard and fast line to be drawn between the sober and the intoxicated. It is obvious that a drug which produces visible effects of intoxication in large doses must have some effect in small doses, and as the dose increases, there must be an increase in the toxic effect. This tends, however, to be gradual, and the fact must be faced that it is impossible to tell precisely when a person is so affected by the drug that he ceases to have proper control of the vehicle that he is driving. The case is further complicated by the fact that hardly two individuals react in the same way to alcohol, and, further, that the same individual may alter in his reactions according to his state of health, the work which he is doing, the social and other surroundings and with the variety of food which has been taken with the drink. In order to facilitate a survey of the literature, it is desirable to have a rough general idea of the strengths of different beverages in terms of ethyl alcohol. Taking round figures without regard for precise accuracy, it may be said that:—

Spirits, such as whisky, brandy, gin and rum, contain about 40 per cent. of alcohol.
Fortified wines, such as port and sherry,   „   „   20 per cent.   „
Natural wines, such as claret and burgundy,   „   „   10 per cent.   „
Strong beer,   contains about 5 per cent.   „
   A large whisky, which should be half a gill (2½ ounces), contains therefore 1 ounce, or 30 c.cm., of absolute alcohol, and the same amount will be present in a pint of strong ale, half a pint of claret, or a quarter of a pint of port.

The absorption of alcohol from the stomach and small intestine begins soon after ingestion. The rate of absorption is dependent upon a number of factors, the most important being the presence or absence of food in the stomach. Food delays absorption and the delay is most marked in the presence of fat and protein (Haggard and Greenberg, 1934; Mellanby, 1919). The concentration of alcohol is important, and generally the stronger the drink the more rapid is its effect. Absorption is usually complete within the first hour, so that after a single dose the maximum concentration in the blood is reached within the same period. After absorption, the alcohol is distributed more or less evenly throughout the tissues, with the exception of the bones and fat. Thus, by estimating the amount of alcohol in the blood, it is possible to calculate the approximate total quantity in the body at that time and the minimum quantity which must have been ingested. About 90 per cent. of the alcohol absorbed is oxidized and the remaining 10 per cent. is excreted mainly by the kidneys and the lungs. At no stage in its oxidation is alcohol stored in the tissues and its disappearance from the blood takes place at a fairly uniform rate, which for rough calculation may be placed at 10 c.cm. per hour (0·185 c.cm. per kilo of body weight (Mellanby, 1919)). It thus takes about three hours for the blood

to be cleared of alcohol after the ingestion of a single large whisky. The excretion by the kidney is of importance, in that at the time of secretion the urine has a similar concentration as that in the blood at the same time. The concentration in the blood varies, however, increasing during absorption and then decreasing with oxidation. It follows, then, that the concentration of alcohol in a given sample of urine will correspond with the average concentration in the blood during the time the urine has been collecting in the bladder (Smith and Stewart, 1932). If the concentrations in the urine and blood are estimated some time after ingestion, when the alcohol in the blood has fallen through oxidation, it may be found that the urine alcohol is at a slightly higher level. This has been estimated according to the ratio 1·3 : 1 (Southgate and Carter, 1926). Urine examination may therefore be used instead of blood examination and gives a reasonably accurate idea of the total alcohol in the body.

DRUNKENNESS OR "UNDER THE INFLUENCE"

Before discussing the effects of alcohol, the distinction between "drunkenness" and "being under the influence of alcohol" must be clearly defined. Although a person who is drunk is undoubtedly under the influence of alcohol, one who is under the influence of alcohol is not necessarily drunk, in the ordinary sense of the word. This distinction has been recognized in the Road Traffic Act, 1930, in which the word "drunk" was replaced by

"under the influence of drink or drug to such an extent as to be incapable of having proper control of the vehicle."

A similar recognition was made in the recommendation of the Committee of the British Medical Association, in that the word "drunk" should

"always be taken to mean that the person concerned was so much under the influence of alcohol as to have lost control of his faculties to such an extent as to render him unable to execute safely the occupation on which he was engaged at the material time."

This recommendation has a wide application, for the occupation at the material time might involve merely walking along the street or it might involve driving a car during the dark hours. The skill and coordination required in these two occupations are obviously at complete variance.

THE CENTRAL NERVOUS SYSTEM

The first effects, and indeed almost all the effects of alcohol, are exerted through its action on the central nervous system. It was formerly believed that the action on the central nervous system was first one of stimulation, followed by depression. It is now generally considered to be from first to last a depressant of the central nervous system, the apparent stimulation being explained by the depression of inhibitory impulses. There appears to be a genuine stimulation of short duration during the early phase of absorption, and there is also a preliminary increase in the absorption of oxygen by brain tissue (Robertson and Stewart, 1932), but this is of no importance in this study.

It is generally agreed that one of the first effects of alcohol is a general diminution

in control. There is a blunting of self-criticism and a weakening in judgement. It is this lowering of control and self-criticism which gives the feeling of euphoria which is the main attraction of alcohol. The toxic effect gradually increases and incoordination of movements progresses in such a way that the finer highly skilled movements are first affected, then the less fine movements, until incoordination in such a primitive movement as walking is shown.

Tests.—A great deal of work has been done to ascertain if there is a measurable effect of alcohol in its earlier phases on the various reflexes and on coordinated actions which might be made use of in diagnosis. A list of these works appears at the end of this article, from which the reader may obtain such information as there is. The tests vary from such simple reactions as the speed of reaction to sight and sound and movements of the eye, to more complicated tests involving judgement and discrimination. In addition to the ordinary laboratory tests, several observers, including Vernon (1919) and Newman (1940), have increased the realism in testing the driver by placing him in the driving seat of a motor car with all the regular controls and, by means of a cinema film, giving the illusion of driving along a road. The way in which the driver keeps to the road, passes obstacles, brakes, and his rate of speed, are all recorded and a composite test is obtained for his general driving ability.

These tests are capable of evaluating skill and quickness of reaction in activities which are necessary in driving a vehicle, but the difficulty arises from the fact that they cannot show whether a person is able safely to be in charge of a motor car or not, for, as Newman says:—

"an individual with half the skill of another as recorded by these tests may be the safer driver if he recognizes his limitations and remains within them."

It may be accepted from a careful perusal of the available literature that there is in general a lengthening of reaction time and diminution of discrimination with moderately small doses of alcohol, the magnitude of the delay in reaction time depending upon the degree of complication of the task to be done. Many of the tests were carried out after a dose of alcohol equivalent to one large whisky, producing a concentration of approximately 0·05 per cent. in the blood. The slowing of the reactions can be shown before there is any clinical manifestation of intoxication. The lengthening of reaction time varies considerably and is often not of great extent, but it must be remembered that a delay of 1/10 of a second means that a car travelling at 50 miles per hour needs an additional 7·3 feet of road in which to pull up.

In practice, several tests have to be made, for from time to time an individual is examined who improves under the influence of alcohol in one or other of the tests; although it is agreed that if a sufficient number is applied, no subject ever improves in all.

BLOOD ALCOHOL CONCENTRATION

With increasing concentration of alcohol in the blood, the incoordination becomes progressively greater and the question has been hotly debated whether there is a point at which it can be assumed that the person is incapable of driving a motor

car. In many of the States in America precise limits have been laid down, and if a person is found to have that percentage of alcohol in his blood it is in itself accepted as proof of intoxication. The reader will remember that one large whisky in a medium-sized man produces a concentration of approximately 0·05 per cent in the blood. The most commonly accepted figure indicating intoxication is 0·15 per cent., which represents a dose of three large whiskies. It is generally known that cases occur in which one whisky produces definite intoxication, and all are familiar with others in which three large whiskies may produce little apparent effect, but the question arises, even if there is no precise clinical effect "is the toxic effect of alcohol on the reactions likely to make a man a bad driver" None of the tests proves this, but they all show that there is a diminution in those reactions and controls which might diminish the driver's skill. It would appear also that alcohol tends to cause a driver to increase his speed without knowing it and to take risks that he would not ordinarily take. It is equally well known that some drivers, knowing the effect of alcohol upon them, habitually exercise more care than usual after drinking.

An interesting series of observations made in the United States (Holcomb, 1938) gives further light on this question. In one investigation of cases of persons accident when the drivers could be examined, it was found that 47 per cent. of drivers involved in accidents had been drinking, 25 per cent. of them having 0·1 per cent. of alcohol in the blood and 14 per cent. 0·15 per cent. or over Holcomb made a further investigation of a general cross-section of drivers in certain locality over a period of a week. These consisted of 1,750 drivers examined on the road at different periods of each day and night. He ascertained that 12 per cent. of these drivers had been drinking and as they comprised a fair cross-section it may be assumed that about 12 per cent. of all drivers are in the habit of drinking to a greater or less extent.

ALCOHOL AND ACCIDENT-PRONENESS

Since the previous investigation indicated that 47 per cent. of drivers involved in accidents were in the habit of drinking, it would appear that the accident-proneness of the drinking driver is considerably greater than that of the non-drinking driver Since the percentage of alcohol in the blood of each driver was known, it would be of interest to find out at what concentration the chances of accident in the non drinking group approximated that in the drinking group. It was found that the accident-proneness increased as the amount of alcohol in the blood increased as would naturally be expected, but that when the concentration of alcohol reached 0·05 per cent., or lower, there was no increased tendency to accident. In other words, there was the same chance of accident in drinking and non-drinking drivers when the former had 0·05 per cent. or less alcohol in the blood. This indicates that at that concentration, which represents about one large whisky, alcohol is not a significant cause of accidents. Holcomb (1938) calculated that a driver with 0·15 per cent. alcohol in his blood had fifty-five times as great a chance of meeting with an accident as one free of alcohol, and if his data are correct, they illustrate the importance of the problem and the necessity of dealing with it.

CONCLUSION

It may be accepted from the present study:—

(1) That the part played by the so-called drunken motorist in road accidents has been greatly exaggerated.

(2) That the ingestion of alcohol exercises a deleterious influence on driving and is a potential danger in quantities which do not produce sufficient effect to be recognizable by clinical examination.

(3) That the chemical examination for alcohol in the blood can give a reasonably accurate idea of the total amount ingested and, although in itself it cannot prove that a person is incapable of having control of a motor, it can indicate that the skill of the person driving is reduced.

(4) That the point at which alcohol induces dangerous driving cannot be laid down for any one individual, but there is sufficient evidence to indicate that at or about 0·125 to 0·15 per cent. in the blood, there is a definite danger. This does not mean that below that figure the driver is not affected; he may be clinically intoxicated with less than 0·1 per cent., but the position becomes critical at that concentration.

(5) That at a concentration of 0·15 per cent. the *majority* of people are intoxicated, but some are not and therefore, although no rigid interpretation of intoxication is possible from the test, it can quite properly be used as a corroborative test.

(6) That if the definition of a number of States in the U.S.A. were adopted in this country, namely:—

"If the ability of a driver has been lessened in any degree by the use of intoxicating liquors, then the driver is assumed to be under the influence of intoxicating liquor,"

then the problem of suitably dealing with the drinking driver would be greatly simplified.

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IMPROVEMENTS IN MOTOR CAR DESIGN AS AN AID TO SAFER DRIVING*

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AN inspection of road accident statistics shows that only 3·5 per cent. a attributed to defects of the vehicle, and these are mainly defects of maintenan or material. Even that admirable document, the "Alness Report on the Preventio of Road Accidents" (1939), can only find justification for two pages of comme on vehicle design out of a total of sixty pages of recommendations. In the asses ment of cause, design is thus largely exonerated and, although it probably escap some blame through being taken for granted, it will generally be conceded th the modern car, on account of its responsiveness and ease of control, is a r markably safe machine to handle.

The main improvement of cars in recent years has been in the direction of pc formance, comfort, appearance and safety. In the lower-priced models, by whi the roads are most frequented, economy, too, has been ever present in the mi of the designer. But these factors are often mutually exclusive. In the 1930 for example, there was a tendency, in the interests of appearance and perha comfort, for bodies to get lower and bonnets longer. Bonnets of a size out of proportion to the engine they enclosed would obstruct the driver's view of t road for many yards ahead. Further, even safety factors can be incompatib British designers tend to make the front windscreen pillar as narrow as possib in the interests of vision, whereas across the Atlantic, roofs are designed to susta violent impacts and the front pillars are consequently substantial. Our view this conflict is that the prevention of accidents is a higher aim than the minimizi of their effects.

Coming to closer consideration of motor vehicle design from a safety standpoir the qualities which make for safety can be largely considered as separate elemen of:—(1) Control; (2) stability; and (3) vision.

CONTROL

The *steering* on all modern cars is so reliable that no great improvements need l asked for in this respect. Steering defects are generally due to faulty materia but care in design and production have made sudden loss of control an extreme rare event. The extent of lock and the size, position and inclination of the steerir

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* The authors of this article, whilst writing from within the motor industry, and therefc: with a wider purview than the average motorist, express opinions which are essentia: their own, as motorists with a particular interest in safety on the roads.—ED.

wheel are matters of individual preference, and the experienced driver who has the combination of these qualities that he prefers, is probably the safest.

It is not easy to generalize on the most suitable steering ratio as a compromise between lightness of touch and the degrees of turn necessary for any given deflection of course. Some drivers will prefer a light touch with a lot of movement, others a heavier feel with less wheel rotation. The variable ratio steering combining the first of these qualities in the extremes of lock, with the second for normal straight ahead running, is a recent development which promises to give the best of both worlds.

Brakes, although invariably good in the modern new car, require maintenance, and there must be at any given time many vehicles upon the roads on which the braking system has been allowed to become inefficient. Recent improvements in design, however, should render brakes efficient for something like 10,000 miles before adjustment is necessary. The type of brake drum which admits water and becomes inefficient for a time after a hosing, or after driving through a ford, should be remedied. Most important of all is the maintenance of brake balance. Brakes which grab fiercely on one wheel, to deflect the course of the car, are dangerous. Good braking will give even operation, making allowance for the transfer of weight and road adhesion from the rear wheels to the front as the brakes are applied. When skidding occurs on a normal road surface, it is due either to bad brakes or bad driving, or a little of both.

It must not be forgotten that, in addition to effective retardation, the facility of lively acceleration may also contribute to safety. A minimum of three pedals still appears to be necessary to control a motor vehicle—but drivers are never endowed with more than two feet! The valuable time lost when sudden braking is needed, in moving the right foot from accelerator to brake pedal, is often more than the difference between good and bad brakes in terms of stopping distance. If a single pedal could be made to serve the dual purpose of accelerator and brake, this lag would be largely eliminated. The separate functions would have to be provided by distinctly different movements, and that for the brake would have to suit the instinctive reaction to danger and be capable of transmitting the full power of the driver's leg. A device of this type was tried out with success some years ago, and mechanical ingenuity should be able to provide new solutions to this problem.

STABILITY

The quality of stability depends primarily upon good springing and low centre of gravity in relation to breadth of wheel track. Steering also enters into this aspect of car safety, so far as cornering is concerned, which is when stability obviously matters most. There is still a great deal of difference between the cornering qualities of different cars, and more attention might be given to the design of springing to this end as well as for comfortable riding.

The aim should be, whilst allowing resilient riding in the vertical plane, to resist body or chassis sway relative to the axles in a transverse horizontal plane. This depends upon a rigid chassis which will not weave or wring under cornering stresses, and springs designed to be flat under a normal load, in which position they obviously have their greatest lateral rigidity.

VISION

For safety, the driver needs a clear and uninterrupted view in front of him, and for nearly ninety degrees to right and left. In addition, the nearer to his front wheels the road is visible, the better. To ensure clear, wide-angle vision in all conditions, the double windscreen wiper is essential, and a de-frosting device should also be regarded as a necessary auxiliary.

The chief obstruction to the driver's view has been from the front pillar, which can hide for an appreciable time any object approaching the path of his vehicle at an appropriate speed. It is doubtful if this factor has been given sufficient attention as a cause of collisions at cross roads, and with pedestrians crossing the street. It would seem an advantage to reduce these blind spots to a minimum —even, if necessary, at the price of the strength of the roof.

The importance of *safety glass* has been appreciated by the manufacturers, who have for some time past almost invariably fitted safety glass throughout the car, and in this respect they have been in advance of legislation and have gone far beyond its provisions. It was in 1931 that an Order under the Road Traffic Act of 1930 made safety glass compulsory, and then only for the windscreen. The recent toughened glass which has the property of crumbling to fine particles if it breaks at all, has largely replaced the older laminated glass, perhaps more for the convenience of body builders than for any greater safety it can claim.

The thought naturally arises that transparent plastics as used in aircraft might have their place in the car of the future. But those at present in use would be unserviceable on the roads, being easily abraded by dust. No doubt substances could be made with a hard surface, but then they would have all the other physical properties of glass. If a suitable plastic, however, were found, it might be easier, than with glass, to produce curved transparent surfaces, and in this event body design could be greatly changed and the driver's vision improved.

Vision to the rear is also important, and if it has to be by means of an inside mirror, the rear window must be of adequate size. As this window can so easily be obstructed by a passenger's head, and may not reveal a vehicle already drawn out to pass, there would still seem to be a case for the outside mirror. The use of the rear window blind when worried by light from behind becomes an infringement of the law when there is no outside mirror.

Seat level.—The tendency for seats to get lower, bonnets longer, and screen rails higher, can be said to have reached its limit in 1937. From 1938, some models showed a trend in the opposite direction, giving the driver a view of the road much nearer to the front wheels and sometimes even a view of his near side wing. Whilst a rear engine layout has been advocated in order to enhance this quality, the best examples of driving visibility in conventional cars of to-day are good enough for all practical purposes. Further, the engine in its usual position must cause a considerable reduction in the severity rate of accidents to the occupants of cars, and need not add to the risks to pedestrians. There would appear, however, to be a strong case for making the driver's seat adjustable in a vertical, as well as in a horizontal plane. The sitting height of an individual who may drive a given car must vary over at least six inches—enough to make a difference of many yards in the distance at which the road becomes visible.

NIGHT DRIVING.—Coming to visibility at night, of all safety problems *dazzle* is at the moment most in the public eye! Some experts have advocated the retention of war-time head-lamp masks giving a flat-topped beam (Douglas, 1944); others have deprecated the suggestion (Tombs, 1944). It is at least reasonable to assume that inadequate lights on vehicles have been largely responsible for the great increase in road casualties during the black-out.

Statistics for the immediate pre-war years attributed about 1 per cent. of fatal accidents to dazzle—not a large figure—and the suggestion presents itself that even in these cases there may have been other factors sharing the responsibility. Dazzle is admittedly most unpleasant; except for the lights of the oncoming vehicle nothing can be seen, but only if there is nothing to be seen. If anything occupies the driver's share of the road in front it can be seen either against the approaching lights, or will be illuminated by the lights of the car itself. Admittedly, dazzle is an evil, but it is a lesser one than inadequate illumination.

It has been frequently suggested that dazzle might be overcome by applying the principles of polarized light. Although theoretically possible, the varying camber and other inequalities of the road, by throwing the polarizing screens in lamp and windscreen out of true phase, would tend to nullify its advantages. Even dust on the screen would modify the filtering effect. In addition, the light loss by polarizing would necessitate the use of headlights of at least four times their present power (D.H.S., 1944).

The old arrangement, to which a return has just been made, of putting out the off-side headlight and dipping the nearside one to the left, is probably the best available at present, but investigation should, and probably will, proceed on the lines of devising reflectors and lamp glasses which will combine good, even spread with adequate forward range, whilst avoiding directly dazzling beams of light. Standardization of size, power and height of head-lamps on all vehicles would help in controlling this problem.

COMFORT FACTORS

One or two further considerations are worthy of attention, and of these the physical comfort of the driver is most important. Comfort that will reduce fatigue will make for safety, provided it does not cause sleepiness, and this is a matter of (1) seating and (2) ventilation.

(1) *Seating.*—The ideal seat should slope down from front to rear at an angle of about 10°, and the back should make an angle a little greater than a right angle with it. The back should be high enough to support the shoulders and have no marked concavity, thus allowing the driver to ease himself by slight changes of position. The driver fits into a bucket seat like a snail into his shell, and thus slight shifts of weight for relief on a long run are impossible. The seat should also be deep enough to support the thighs almost to the bend of the knee and high enough to allow the legs, when the feet are on the pedals, to come down at an angle considerably nearer the vertical than the horizontal.

The very low seat not only gives poor vision but keeps the hamstrings stretched in a manner that may be most fatiguing. With an upright posture the body is

more favourably placed for rapid action in an emergency. The hands, too, kemuch warmer if the forearms are approximately horizontal, than if they are reachi
up to a wheel on a level with the driver's head.

In general, the seating position in private cars has been too reclining and
commercial vehicles perhaps too upright.

(2) *Ventilation.*—The more luxurious models of the future will be fitted wi
air-conditioning equipment, enabling extremes of temperature inside the salo
to be avoided. This, in eliminating stuffiness, will obviate the danger which m
arise from the soporific effect of a close atmosphere upon the driver. This k
effect may arise much more frequently than is generally recognized, and may
aggravated by exhaust gases from the engine. The conditions of air pressu
produced by the speed of the vehicle appear to be such that gases which esca
into the bonnet are bound to find their way through any apertures in the flc
into the body of the car. Since drivers will probably continue to run cars wi
worn pistons, provision should be made for changing the air inside the body.

Some cases have been described in which toxic effects upon the nervous syste
lasting for weeks, are attributed to exhaust gases (Eurich, 1943). Such effects m
be comparatively rare, but their occurrence lends weight to the hypothesis tl
minor degrees of toxæmia, rendering an occupant of a car incapable of skil
driving, may be not infrequent.

THE ALNESS REPORT

It is significant, as mentioned on page 214, that, out of over sixty pages of this repo
two only are devoted to recommendations concerning the vehicle, and these a
chiefly in respect of maintenance rather than design.

DOOR DESIGN.—It is recommended, apparently on account of the eviden
of the cyclists' representatives, that doors should be hinged at the front or ma
to slide. True, *the rear-hinged door* can be a source of danger to the occupant
a car if it flies open at speed, taking a passenger with it or causing a sudden swer
by its wind resistance. It can also be a danger if it is opened when the car
stationary without the driver being able to see that the road behind is clear. In tl
respect *the front-hinged door* has the slight advantage that the driver is able to op
the door a little and look behind him before continuing the process. On the oth
hand, if it is opened carelessly, it would be a more serious obstruction to an ove
taking cyclist who collided with it, as it would not tend to shut as would a rea
hinged door.

One approach to this problem is the provision of *the outside mirror,* now seldo
used, but the best would be to make it reasonably easy for the driver to slip acro
to the nearside seat and alight upon the pavement that way. There is no reaso
why, if gear and brake hand controls cannot be mounted under the dash or o
the steering column, they should not be smaller and placed between the seat
Twenty years ago, many cars had a bench type seat and some were without a
offside door, and if the very low bucket type of seat were abolished, crossing the ca
would be easy and there would be little need or temptation to sling open th
offside door.

The sliding door is virtually impossible from a design standpoint and would carry with it the additional danger that it would almost certainly jam in any accident, involving body distortion or damage to the side panels, making it difficult to get the occupants out—a potential source of tragedy in case of fire.

The Alness Report recommends that the driver's vision should not be obstructed by a high dashboard, and that the width of a commercial vehicle should be shown by two rear lights—a provision which could with advantage also be applied to private cars.

It is safe to say that the Alness Report is much more helpful in respect of road design and usage than of vehicle design, which can perhaps be construed as an *acknowledgment of the inherent safety of the modern vehicle.*

MITIGATING ROAD INJURIES

Finally, allowing for the fact that there will always be accidents, it is well to consider how their effects can be minimized.

The application of certain principles appears to have done much to reduce fatalities in air crashes, and there would appear to be little doubt that some mitigation of the effects of road accidents could be brought about by their fuller adoption in the design of cars.

10 LB.

12 INCHES

A	B	C
480 LB PER SQ. CM.	960 LB. PER SQ CM	2800 LB PER SQ CM.

FIG I.
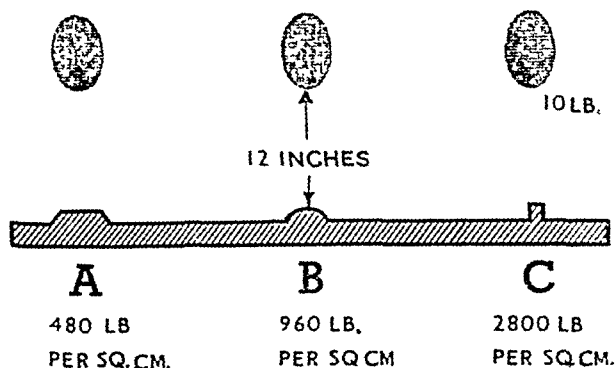
The above diagram (fig. 1), taken from a recent article (Klemin, 1944), shows the pressure to which a body approximately the weight and shape of the human head would be subjected in falling on to differently shaped surfaces from a distance of one foot.

The results of any part of the human body being struck by a small hard object are always likely to be more serious than a blow from a flat surface, particularly if that surface be resilient, even to a slight degree.

Applying these principles to car design, although certain obviously dangerous mascots presenting sharp points to the front have been forbidden, a great deal more might be done in this direction. A mascot and a club badge are quite

unnecessary components of a car, and either might inflict a severe injury which need not occur from a collision with a flat radiator, bumper or wing. Club badges, if they must be displayed, should always be mounted flat on the radiator grille and not on the bumper or top of the bonnet.

There would appear to be an advantage in the completely streamlined car, for even the side-lamp mounted above the wing, instead of within it, might prove a lethal instrument and, in any event, door handles would be safer if recessed, and concealed hinges might even be adopted with advantage.

Although motor vehicles cause more fatalities among other road users than among their occupants, it would also be advisable to cut out all hard knobs inside the body which might cause an injury to the driver or passenger.

It is well known that in a collision the driver generally fares better than his passengers, presumably because the steering wheel prevents him from being thrown forward. In a limited experience of road fatalities, however, two drivers are known to have died from a ruptured abdominal organ which must have been caused by impact with the steering wheel. The risk of such an event would be lessened if the type of wheel with flexible spokes and rim were fitted in all cars.

CONCLUSION

It is fair to say that if the major requirements of road safety, namely, properly designed roads and competent, considerate use of them, are for the moment disregarded, then the modern motor vehicle has achieved a standard of safety which would have been thought unattainable fifteen or twenty years ago. If this question can be summarized in a brief sentence, it is that for the moment the improvement of this quality of safety rests more in minor refinements of the present design than in any revolutionary change in the nature of the vehicles being used to-day. If revolutionary change is necessary, it will be needed more in the roads than in the vehicles using them.

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ACCIDENT-PRONENESS ON THE ROAD

By ERIC FARMER, M.A.

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ROAD accidents are a serious social evil in modern society. The gradual increase of motor traffic has meant a gradual increase in accidents, and this very gradualness has led to a certain degree of habituation, so that the high accident rate on the road has come to be regarded as an inevitable part of modern life. The causes of road accidents are multiple. This complexity makes clear thinking difficult and provides an excellent field for generalization. The Medical Research Council's Industrial Health Research Board has carried out a series of investigations which have yielded certain definite results on accident causation. These results make it easier to get a clear idea about the causes of accidents and steps that could be taken to lower their incidence. It is proposed to discuss in this article some of the results of these investigations.

The clearest conclusion that has emerged from these investigations is the distinction between accident liability and accident-proneness. Between them these two factors determine accident rate, and effective preventive measures will depend upon the relative importance of these two factors in any class of accident.

By *liability* is meant the sum total of all factors determining accident rate. By *proneness* is meant those personal qualities which render some people more likely to have accidents than their fellows, when exposed to the same risks. This distinction between liability and proneness has been shown to hold true for both industrial and traffic accidents, but it is only the latter that will be discussed.

ACCIDENT LIABILITY

Weather conditions play a large part in liability to road accidents. They cannot be altered but they can be guarded against by taking special precautions. When weather conditions are sufficiently severe, so as to cause dense fog or icy roads, drivers are forced to drive with special care, and in these circumstances their accident liability may be reduced rather than increased. With less severe conditions, involving poor visibility or wet roads, the need for care is not so obvious, and drivers may continue to drive at a speed that would be safe under normal conditions but is unsafe when conditions are below normal.

Density of traffic is another factor in accident liability on the road. Those who constantly drive in built-up areas usually acquire habits of driving conducive to a low accident rate. This is illustrated by the comparatively low accident rate of the London bus driver. His exposure to risk is great, but by recognizing and guarding against it, his accident record is a good one. The matter may be different with those driving long distances who have to pass through built-up areas in the course of their journey. Naturally they reduce their speed when doing so, but the

feelings of speed are relative to those that have preceded them. Such drivers ma
reduce their speed in relation to the one at which they drove before reaching th
town, and yet it may not be sufficiently low to fall in with the general standard c
speed conducive to safety in a built-up area. Variations in speed where traff
is dense is one of the main causes of accidents, for it introduces a foreign elemei
into the habitual judgement of speed of urban pedestrians and drivers alik
Speed is a most important factor in accident liability on the road. There is r
such thing as a safe speed; any movement at all implies the possibility of collisic
with an object. Nevertheless, the greater the speed the greater the liabilit
on account of the increased length of time it takes to bring the vehicle to a standsti

The time it takes to stop a vehicle is determined by the material factors of ros
surface, efficiency of brakes, weight of vehicle, weight and disposition of loa
and by the personal factors of accuracy, speed of perception, comprehensio
judgement and sensory motor coordination. The material factors belong to th
sphere of accident liability and to a large extent, can be guarded against by prop
precautions and a fuller realization of the variations they introduce into drivir
conditions. The personal factors belong to the sphere of accident-pronene
and will be dealt with later under that heading.

The type of vehicle is another important factor in accident liability. On the whol
the heavier the vehicle the more liable it is to accidents. This is due partly to i
size, which offers a greater area of exposure to collision, and partly to its lower
manœuvrability on account of weight, size and load. Motor cycles are usual
driven faster than heavy vehicles, but their accident rate is not as high as mig
be expected, because their manœuvrability is great and their area of exposure sma
Moreover, in accidents in which motor cycles are involved the injured person
usually the rider, whereas in accidents in which heavy vehicles are involv
the driver is less often injured than others. This 'fact may have the effect
lessening the attitude of caution on the part of drivers of heavy vehicles, since the
personal safety is not so closely involved in an accident as that of others.

The condition of certain vehicles on the road sometimes leaves a great deal to k
desired from the point of view of safety. Regulations to deal with this were i
operation before the war, but they were not highly effective, and a tightening of the
regulations would tend to lower accident liability. The fact that few acciden
are due to mechanical defects in well-run public transport companies is due to th
systematic servicing of their vehicles. The opposite is sometimes the case i
certain less well-run transport companies, and this is recognized by their insurer
and an increased premium is charged.

PREVENTIVE MEASURES

Hours of driving.—The most effective way of guarding against the various facto:
involved in accident liability on the road is to have a high standard of managemen
and a high standard of driving. The commercial driver cannot be expected to b
responsible for the mechanical efficiency of his vehicle—that is the responsibilit
of his firm. Neither can he be expected to drive as slowly as conditions sometime
demand if he is given too severe a time schedule for his journey. Efforts were mad
before the war to regulate the time spent in driving, but the regulations referre

mainly to the employer, and there was nothing to prevent a driver from working the regulation hours for one employer and then doing extra driving in his own time for another. It has been shown that long periods at the wheel disintegrate the physical and mental functions on which efficient driving depend and, unless really effective measures are forthcoming to prevent excessive hours of driving, accident liability is certain to be increased.

Selection of drivers.—The employer cannot be expected to be responsible for a driver's judgement and action in an accident situation, but he can be expected to select his drivers in such a way as to procure the best type. An example of this is the practice of the London Passenger Transport Board, where there is a high standard of selection, involving a medical examination. After selection the men are given systematic training in a special school and later on the road. It is certain that one of the main factors which accounts for the low accident rate of London bus drivers, in spite of their extreme exposure to risk, is the care taken in their selection and training. The matter is far otherwise in certain other transport companies. The drivers usually graduate from van boys and no real attempt is made at selection or systematic training.

It has been shown in comparing the *levels of intelligence* for a large number of occupations that the lorry driver is in the lower ranges and has a mental ability equivalent to that usually found among unskilled labourers. The mere act of driving does not call for high mental ability, but something more than the lowest type of mental ability found in the normal industrial population is called for if driving is to be done in such a way as to avoid accidents. The situations involved in accident liability all call for comprehension and judgement. When these are used, accident situations can be avoided, but when they are lacking the varying factors determining the danger of a situation are not easily comprehended.

Railways have an exceedingly low accident rate, in view of the hazards involved. Admittedly pedestrians are not found to any extent on their permanent ways, but their method of selecting drivers and signalmen differs from that of many transport companies. These occupations are not regarded as low grade, but are graduated to after experience in less skilled occupations on the railways, and the men are selected after a medical examination and given an effective training. This undoubtedly contributes in no small measure to the safety of train travel.

Accident liability among motor drivers changes constantly. Factory workers are presented with a more constant liability. Much of their work depends upon semi-automatic habit formations and, provided they have the necessary skill and sensory motor coordination, the higher mental processes may not be greatly involved. It is far otherwise with the motorist. Some of his reactions depend mainly upon habit formations, but before these are put into operation he may have a complicated process of reasoning to go through in order to decide what action to take. His reasoning in an accident situation must be both accurate and rapid. The action taken by different drivers in similar situations may be different, so that rapid choice of alternative lines of action is involved. All these mental processes depend upon intelligence, which enables a man to solve a presented problem rapidly and in such a way as to procure a desired end, which in driving a car is the avoidance of collision. There is no given reaction in any road accident situation that can

automatically be brought into play; judgement and choice of alternatives are always involved.

For these reasons it is essential that those who spend long hours on the road in charge of the most dangerous type of vehicle should be of a higher mental level than is often the case. If they have good mental ability their accident liability will be lowered, for they will be able to avoid many accident situations into which a less thoughtful person might run; and when they find themselves in such situations their capacity for rapid and accurate thought will increase their chance of avoiding an accident.

ACCIDENT-PRONENESS

The series of investigations directed by the Industrial Health Research Board have shown conclusively that some people are more prone to accidents than others exposed to equal risks. This proneness increases the accident liability of certain people under all conditions of exposure to risk. Variations in liability affect the accident rate of the prone and the non-prone, but, whatever the variations in liability, the accident rate of the prone is found to be higher than that of the non-prone. In any group of industrial workers or motor drivers the number of the specially prone is small, usually not more than about 10 per cent., but it is found that about 50 per cent. of the total accidents sustained in the whole group are due to this small minority of especially prone persons. This proneness is a relatively stable factor, so that those especially prone have an undue number of all types of accidents, and they tend to have a higher accident rate than their fellows in all periods of exposure. Accident-prone persons are perfectly normal individuals, but their sensory motor coordination is less accurate and slower than that of others, which lessens their ability to deal with an accident situation.

Tests.—Certain tests have been devised which partially measure accident-proneness, those succeeding in the tests having a subsequent accident rate lower than that of those who fail. Another way of predicting the people most likely to have accidents in the future is by examining their past accident records. Those with a high accident rate in an initial period always tend to have a higher rate than others in all subsequent periods of exposure.
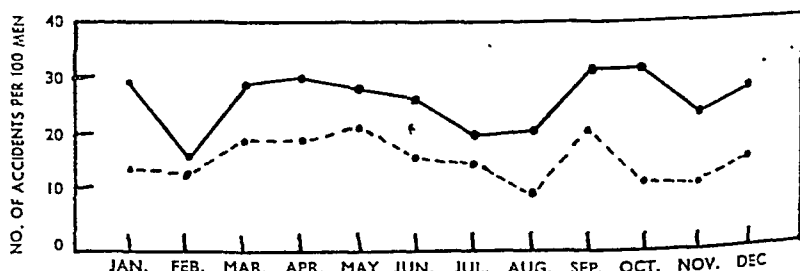
FIG. 1.—The unbroken line in this figure represents the accident rate each month for the subsequent four years of those drivers who had three or more accidents in their first year. The broken line represents the corresponding accident rate of those drivers who had no accidents in their first year.

All the evidence goes to show that one of the most effective ways of reducing road accidents would be to get a more efficient type of commercial driver. Com-

nercial vehicles are more often involved in road accidents than any other class. f vehicle. The commercial driver is usually in charge of the most dangerous ype of vehicle, and he is also on the road more continuously than any other class f driver.

The data presented in fig. 1 and 2* are derived from a group of 166 commercial drivers exposed to equal risk for five years. A high standard of reporting accidents, even the most minor ones, was in force, so that the frequency rate appears high; the severity rate was, however, very low.
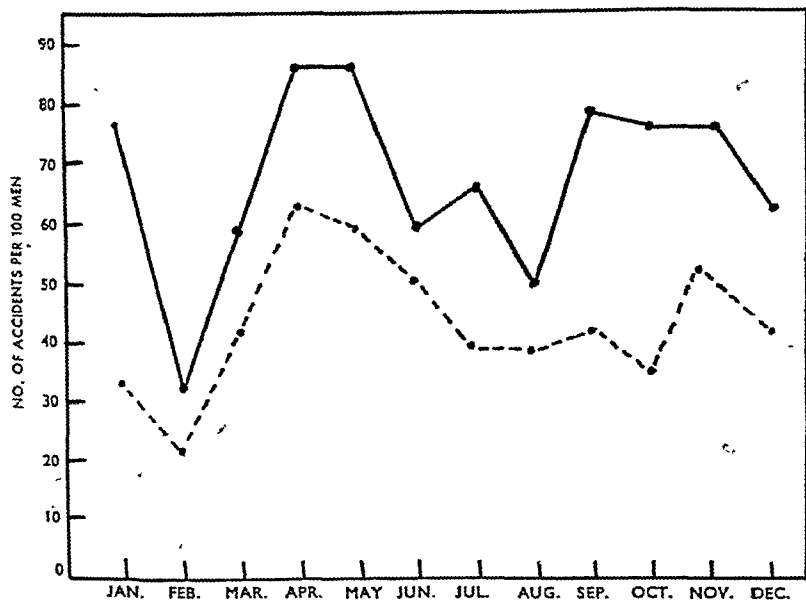
Fig. 2.—The unbroken line in this figure represents the accident rate each month for five years of those drivers with a high degree of accident-proneness, as measured by certain tests of sensory motor coordination. The broken line represents the corresponding accident rate of those drivers with a low degree of accident-proneness as measured by the tests.

Little attention is paid to the selection and training of the majority of commercial drivers. If a standard of selection and training comparable with that of the progressive transport undertakings was made universal, the general standard of driving would be improved and the accident rate reduced. Accident records should be kept in such a way as to show the number of accidents each individual driver sustains per thousand miles. Only records of this kind make possible accurate comparison between drivers' accident rates. Those who are found to sustain an undue number of accidents in any period should be re-examined to see if they still come up to the required standards, or have acquired bad habits of driving. Often by a

* Both figures, which are reproduced by permission of the Controller of H.M. Stationery Office, are taken from the Medical Research Council's Industrial Health Research Board Report No. 84, "A Study of Accident-Proneness among Motor Drivers," by E. Farmer and E. G. Chambers, 1939.

temporary change of work or re-training, such men, on returning to driving, are found to have a lower accident rate. Until the occupation of the commercial motor driver is considered as a responsible one, demanding certain medical, physical and mental standards, the excessively high rate of accidents on the road will continue.

With the private driver the matter is somewhat different, on account of his less uniform conditions of exposure. A test of driving, prior to the issue of a licence, was instituted before the war. This could be greatly improved and a higher standard demanded. A medical examination should be made when granting the licence, and it should be repeated at regular intervals. Private drivers involved in accidents should be re-tested to see if their physical condition or driving habits have deteriorated.

A beginning should be made by the application of tests that have been shown to predict accident-proneness, and research should be continued to provide predictive tests involving other functions than those already measured. Only a few people in any group are especially accident-prone. Such people could be refused a licence or warned, and their subsequent accident records examined. The fact that they knew that they were especially prone, and that their accident experience would be watched, would tend to make them more careful on the road. Many accidents can be avoided by those who know they are accident-prone if they avoid taking risks which others can take with greater impunity. All people involved in accidents, whether adjudged negligent or not, should be tested to see if they are accident-prone. It has been shown that accident-prone persons have a larger number of both blameless and blameworthy accidents than those who are not accident-prone as measured by the tests. Assigning blame for an accident is a difficult matter and a poor substitute for avoiding one. In order to accomplish the latter it is better to concentrate on medical and psychological tests and effective training, rather than to confuse the issue unduly with moral considerations.

THE FUTURE

The immediate post-war period offers an excellent opportunity of instituting a radical reform designed to raise the standard of driving. The supply of lorry drivers will be larger than requirements, on account of the large numbers of men that have been trained by the Services. A proper system of selection would ensure that only the best of these became commercial drivers in peace time. A large number of private persons will be applying for driving licences, either after a lapse of years or for the first time. A proper examination of these would make it possible to eliminate at least some of those likely to have a high accident rate. A motor vehicle is a dangerous thing to control, and the public has a right to be assured that it shall be in the hands only of those who can use it with the least danger to others. It is possible with present knowledge partly to ensure this, but public action is called for in order to give practical effect to this knowledge.

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BDOMINAL INJURIES ARISING FROM ROAD ACCIDENTS

By CHARLES NOON, O.B.E., F.R.C.S.

Surgeon, Norfolk and Norwich Hospital.

"In the routine examination of the abdomen the same procedure should be followed as in the examination of the thorax—inspection, palpation, percussion and auscultation. Of these methods the first often receives much too scant attention, while the latter is generally omitted altogether. Time and care spent upon inspection are never lost, and valuable information, which is not available by any other method, is often gained. The abdomen should be inspected from the head and from the foot of the bed, as well as from the side, and with the observer's eye upon a level with the abdomen, as well as above it." (Lord Horder, 1929.)

ABDOMINAL injuries account for a small proportion of all road accidents. evertheless, they form an important group of cases in which urgent surgical eatment is often called for. There is nothing, however, in this type of injury hich divorces it from other abdominal injuries and, whether the injury results om a road accident, a battle casualty, or an aeroplane crash, there is no essential fference in the principles of civil and military surgery, although each may have ; own problems to be solved. The one can learn from the other.

It may be that any remarks now to be made on the subject have been better id by others. Repetition, however, may do no harm. "But what if one does say e same things—over and over? If he has anything to say worth saying, that is st what he ought to do."

During the present century military surgery has, on two occasions, each for a eriod of about five years, dominated surgical outlook. It is therefore interesting) compare and visualize the results, so far as possible, of civilian and military rgery in this type of case during the past fifty or sixty years.

HISTORICAL

he first successful operation for the rupture of an intestine was carried out by roft (1890), at St. Thomas's Hospital in 1889, on a boy who had been kicked 1 the abdomen by a horse. A piece of small intestine was resected, and the lad ecovered.

Two series of cases of traumatic rupture of the intestine, many resulting from oad accidents, have been collected. The first series, 1893–1907, was collected and nalysed by Berry and Guiseppi (1908): 132 cases were recorded, of which 7 recovered and 115 died—a mortality of 87·2 per cent. A second series of ases was collected by the Surgical Registrars of twelve London hospitals etween 1908 and 1912 (*Proc. roy. Soc. Med.*, 1914). In this series there were 14 cases; 9 recovered and 35 died—a mortality of 79·3 per cent.

A third series of cases, of rupture of the spleen, between 1896 and 1904, for which splenectomy was done, has been recorded by Laspeyres (1904). There were 58 cases, of which 39 recovered and 19 died—a mortality of 32·8 per cent.

These records show that the mortality from peritonitis was much greater than from intra-abdominal hæmorrhage.

During the period 1893 to 1912, there were no military cases with which to compare these results. So far as can be ascertained, the abdominal operations for gunshot wounds of the abdomen during the Boer War, 1899–1901, were few, as it was thought that expectant treatment gave the best results.

During the 1914–1918 war, for the first few months expectant treatment seems to have been the rule. Wallace (1930) mentions the difficulty in coming to any conclusion as to the mortality during this period of the war, but he estimated it at between 70 to 80 per cent. After the first few months of the war, surgical organization improved, and operation in suitable cases became the rule. Up to 1917, Wallace recorded 1,288 cases, 965 of which were operated upon, which gave a total mortality (including those not operated upon) of 62·2 per cent.

Cases during the present war have been carefully collected by various observers. Ogilvie (1944) has collected cases of abdominal injury in the Western Desert, and in two series he records 373 cases, of which 162 died, with a mortality of 43·3 per cent.; and a series of 247 cases with 84 deaths—a mortality of 34 per cent.

Gordon-Taylor (1944) has recorded 1,300 cases of abdominal injury in "total war," in two series, namely:—Up to March 1942, cases of abdominal injuries reported in the Bradshaw Lectures 1942: 610 cases; 312 recovered; percentage of recovery 51 per cent. A second series, total operations for abdominal injuries since March 1942: 708 cases; 422 recovered; percentage of recovery 60 per cent.

I have no recent records of a series of cases of abdominal injuries in civilian practice, but it is probable that improvement in civilian cases has corresponded with the results in military surgery.

EXAMINATION AND DIAGNOSIS

Cases of abdominal injury call for a careful examination, a working diagnosis, and prompt treatment, or, to quote Ogilvie's summing up of the treatment of abdominal wounds in warfare, "a simple plan, a purposeful overhaul and a rapid repair."

The *clinical examination* should be as complete as possible, and should consist of a carefully elicited history of the accident, together with the symptoms and physical signs. A complete examination should in most cases enable the examiner to arrive at a working diagnosis, but it is noteworthy how often the clinical examination is incomplete, and how often unnecessary mechanical aids are sought: an X-ray examination is almost always made, but a really complete clinical examination scarcely ever.

In obtaining the history of the case and in making the examination, it must be realized "it is the essential data that we want, and not the unessential. The capacity to neglect is as important as the capacity to take notice."

DIAGNOSTIC POINTERS.—Pain may be the only symptom arising as a result of an abdominal injury. Its presence or absence is therefore of great significance, and it requires special attention, as its character may be of diagnostic importance. Pain may be one of two types: it may be localized to the site of the injury, or it may be referred to some part at a distance and remote from the injury, namely,

ferred pain. Pain referred to the tip of the shoulder is an instance of this and may be of diagnostic significance in abdominal injuries. Irritation of the diaphragm in the region of the distribution of the phrenic nerve may cause stimulation of the sensory nerve arising from the same spinal segments. It thus comes about that pain is felt over the tip of the shoulder, the skin area in this situation being supplied by the descending supra-scapular nerve which arises from the third and 4th cervical nerves. Shoulder-tip pain is frequently a symptom of rupture of the spleen, in which the bleeding has caused irritation of the under surface of the diaphragm.

Vomiting is an occasional symptom. It may suggest peritoneal irritation, or possibly the presence of obstruction, mechanical or otherwise, but, unless prominent, it is not usually of serious importance. The general appearance of the patient must be carefully noted; it is often from this, as much as, or more than, from the local signs, that the presence of internal hæmorrhage may be diagnosed. A careful estimate of the rate, volume and tension of the pulse must be made, and the blood pressure taken.

Abdominal findings.—Lack of movement of the abdominal wall on respiration is a most important sign in all cases. If the abdomen moves well there is good evidence of absence of irritation of the peritoneum, and if there is no peritoneal irritation there is unlikely to be any serious abdominal injury. The presence or absence of abdominal distension is important: it may result from accumulations of fluid, such as blood, and from the retention of gases in the intestinal tract resulting from ileus or obstruction.

Referred pain has already been mentioned. It is convenient to consider local pain, tenderness and rigidity, together. Pain may or may not be increased by pressure. When pain is increased by pressure, and there is local or general rigidity of the abdominal wall, these symptoms taken together strongly suggest the presence of some peritoneal irritation, and peritoneal irritation in cases of abdominal injury suggests the presence of blood or a leak of intestinal contents.

Dullness on percussion is a sign which is not of great importance and cannot be relied upon. The presence or absence of liver dullness is often fallacious. Shifting dullness, a classical sign, is only mentioned to be condemned, as a "shock-producing and hæmorrhage-provoking" physical sign, which no attempt should be made to demonstrate.

Valuable information can be obtained by the use of the stethoscope. The presence of blood and other irritating fluids would seem to lessen peristaltic movements, and so produce a silent abdomen. Friction may be heard occasionally.

CATHETERIZATION, SIGMOIDOSCOPY AND X-RAYS.—In all cases of abdominal injury, the bladder should be emptied either naturally, or, if necessary, by the passing of a catheter. The use of the proctoscope may in certain cases give useful information.

X-ray examination is desirable when it is necessary to prove or exclude the presence of fracture of the ribs or injury to the pelvic bones.

At the conclusion of the examination, the observer should be able to decide (1) as to the probable site of injury—is it abdominal or is it pelvic? (2) as to the effect of the injury—is it one giving rise to hæmorrhage or peritonitis? (3) as to

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The gravity of *injury to the liver* depends upon the size and position of the tear, nd its nearness to the portal fissure. If possible, liver tears are best treated by uture—mattress sutures of catgut, with a piece of catgut slipped into the loop hich, on tying, prevents tearing, or a piece of omentum may be pressed into the ent and tied down with a catgut suture to control the hæmorrhage, or a gauze ack may be necessary, but if packing is used it must be packed tightly.

A patient was admitted to hospital having been crushed between the road and a car. le was suffering from abdominal pain, and pain referred to the left shoulder, with signs of iternal hæmorrhage. The abdomen was opened, and the spleen was found to be torn; was removed. The liver was examined and a tear was found in the left lobe; it was utured, and the abdomen closed. The patient recovered.

Injury to the kidney does not necessarily call for operation, and many cases of evere hæmaturia may recover without. The indications for operation will be ncreasing pallor, rising pulse rate, local pain and tenderness, with possible signs f intraperitoneal hæmorrhage. As has been said, the organ can be explored y abdominal or lumbar incision. It is possible that repair of the kidney may be arried out. It is difficult, however, to estimate the amount of kidney damage hile the organ is *in situ*. If there is injury to the vascular pedicle, nephrectomy hould be done, and probably most cases of injury to the renal parenchyma which equire operation will call for removal of the kidney.

Bleeding may result from *tears in the omentum* or mesentery. Hæmorrhage hould be controlled by ligature of the bleeding point. Mass ligatures should ot be employed. Thread or silk should be used, not catgut.

Tears in the gastro-intestinal tract usually occur in the large or small intestine. Injuries to the small intestine are best treated, when possible, by suture of the njured bowel. Injury to the large intestine will, to make the operation as safe s possible, require a proximal colotomy or cæcostomy.

Damage to the pelvis may result in *injuries to the bladder*, or the urethra, fre-juently complicated by fracture of the pelvis. Bladder injuries may be either ntra- or extraperitoneal. When intraperitoneal rupture of the bladder occurs, he rent in the bladder should be repaired and the bladder drained by an extra-peritoneal suprapubic incision.

A patient was admitted to hospital. He had been drinking excessively and had no clear recollection of what had happened. He had some vague recollection of going home in the black-out, and having either fallen down or been knocked down. He got home and went to bed. He woke in the morning suffering with abdominal pain. Several attempts to empty the bladder were made, unsuccessfully. He was admitted to hospital. His abdomen was distended and tender on examination. A catheter was passed: no urine was obtained. Diagnosis—intraperitoneal rupture of the bladder. The abdomen was opened. A large quantity of urine in the peritoneal cavity was removed by suctional apparatus, the rent closed, and the bladder drained extraperitoneally.

Rupture of the urethra is nearly always associated with fracture of the pelvis. The anterior or posterior part of the urethra may be ruptured. This injury is frequently associated with an extreme degree of shock.

A small boy, aged eight, was admitted to hospital as a result of a road accident. Both femora were fractured. He had a large lacerated wound in the perineum. Urine was trickling out of the wound. He was treated for an extreme degree of shock for twenty-four hours by blood transfusion and plasma drip. As there was a large wound in the perineum, from which urine was running, there was no danger of extravasation of urine. As soon as possible, and when his general condition allowed it, an anæsthetic was given. The bladder

was opened suprapubically, and an indwelling catheter introduced into the bladder through the urethra. The bladder was drained. He made satisfactory progress, but has developed a traumatic stricture of the urethra which is likely to be difficult to treat.

DRAINAGE

With regard to the question of drainage, every case should be dealt with on its merits. Uncomplicated cases of intraperitoneal hæmorrhage will not require drainage. It must be clearly understood that it is impossible to drain the peritoneal cavity. Lawson Tait's well-known aphorism "when in doubt drain," was acted on for many years. With the use of sulphonamide drugs, the use of a drainage tube is much less often necessary. It might now be said, when in doubt, "drain the peritoneal cavity less, but the abdominal wall more."

PRE-OPERATIVE AND POST-OPERATIVE TREATMENT

When operation has been decided upon, *pre-operative treatment* is all-important. Great advances have been made in pre-operative treatment during the last ten years, and these consist in adequate warmth, morphine and blood transfusion. The main·object in these days is the condition of the patient before and after operation:—"We seek to make him as safe for surgery as surgery has been made safe for him."

Post-operative treatment will be directed mainly to the prevention and treatment of shock and infection. The perfection of the technique of transfusion with blood and plasma has done much to save lives of patients who have had hæmorrhage and are suffering from shock. Infection can often be prevented and controlled by the judicious use of sulphapyridine or sulphathiazole. It is undesirable to give abdominal operation cases large amounts of fluid by the mouth. These drugs are therefore best given with intravenous saline transfusions. The appropriate dose of the selected drug in the form of its soluble sodium salt should be given by constant drip, during each twenty-four hours, in 2,000 to 3,000 c.cm. of normal saline, 100 c.cm. being given every hour.

CONCLUSION

In a short article it is only possible to deal with a limited number of points. The diagnosis and treatment of abdominal injuries are chiefly concerned with the problems arising as a result of shock, hæmorrhage and septic infection. Great advances have been made in the treatment of all these conditions during the last ten years. By the development of a blood transfusion service, cases of shock and hæmorrhage can be much more efficiently dealt with than was possible even a few years ago, and the introduction of the sulphonamide drugs has done much to increase efficiency in the prevention and treatment of septic infections.

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THE ORGANIZATION OF AN ACCIDENT CENTRE

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GENERAL CONSIDERATIONS

BEFORE describing the organization of an accident centre, it is first essential
to define the nature of the work expected of this new development in hospital
services. What is accident surgery? The late Sir Cuthbert Wallace (1939), repre-
senting the Royal College of Surgeons, and reporting to the Interdepartmental
Committee on the Rehabilitation of Persons Injured by Accident, said:—

"Traumatic surgery covers such a lot of ground; a man may have a crack on the head
or a ruptured intestine. You cannot expect a man to specialize in all these things; they really
belong to different departments. By talking of traumatic surgery you are mixing up a lot
of things it appears to me."

Such an expression of opinion by so distinguished a surgeon has caused a certain
confusion in the minds of many concerning the field of accident surgery.

Accident surgery is not the surgery of ruptured livers, spleens, kidneys and
intestines, and severe head injuries. These are comparatively rare injuries.
Instead, it is the surgery of the common injuries of the locomotor system; and
because they are common they are important. The Birmingham Accident Hospital
now treats 30,000 accidents each year. During that period about a dozen abdominal
and pelvic visceral injuries are seen requiring the immediate attention of abdominal
and genito-urinary specialists, and fewer injuries of the chest requiring the specialist
in thoracic surgery. Certainly the problem of serious head injuries, either as
isolated lesions or combined with severe extremity injuries, is more common;
even so the hospital cerebral surgeon is not called in more frequently than fifty
times each year.

Obviously these specialists' services must be provided and available at the
immediate service of an accident centre, for the treatment of these major injuries
is a life-saving emergency, but in organizing an accident service it is wrong to
over-emphasize their importance. They represent 0·3 per cent. of the whole
problem.

The main work of an accident service is not so much to save life as to save
function. Indeed 99 per cent. of its work is concerned with injuries to the locomotor
system. Nevertheless, to meet the problem of major visceral injuries an accident
service must be closely attached to the services of a general hospital.

Confusion as to the real meaning of "accident surgery" has arisen by the common
use of that astounding classification of surgery into major and minor procedures.
There is no such thing as minor surgery, when injuries are viewed, as they should be,
from the point of view of their functional recovery. This commonly used classifica-
tion in surgery has resulted in the most important functional unit of the locomotor

system—the hand—being allocated to the realms of minor surgery. Yet, in the hand, judged from functional end-results, are to be found problems which challeng the technical skill of the most expert surgical craftsman. On functional standar I would prefer my own work to be judged on patients I have treated for compou fractures of the femur rather than compound fractures of the proximal phala of the finger. I feel much safer in attaining a useful working hand by a multip tendon transplant for a permanent musculo-spiral palsy than by a single tend graft for a lost flexor tendon of the finger. Of all the surgical problems with whi I am familiar none is so difficult as the reconstruction of the badly crushed han Yet it is common hospital practice to relegate the care of hand injuries to juni house officers. A commoner hospital practice still, is to confuse the work of casualty department by mixing the admission of these accident problems with tl life-saving medical and surgical emergencies. The result is that injuries, in whi recovery of function is in jeopardy, take second place to the more urgent life-savir emergencies.

The full solution of this problem would seem to require a revision of the who organization of the casualty departments of general hospitals. Accidents ha become so numerous that if this body of work were taken away from the casual departments of general hospitals, two advantages would follow. First, accide treatment would become more efficient and, second, the general medical ar surgical casualty services would also be more efficient.

This article is concerned with the first factor, and it is an attempt to consid the organization necessary for a large accident centre, i.e., one serving a populatic of at least 250,000 people.

WHAT ARE THE MAIN CAUSES OF ACCIDENTS?

If the pre-war (1935) national figures are taken as an example, an accident servic may expect to receive 55 per cent. of its patients injured from miscellaneous caus (in normal domestic and recreational activities), 30 per cent. of its patients w have suffered accidents while at work, and 15 per cent. will be the result of roa traffic accidents.

In brief, these patients will be a fair section of the community—men, wome and children. The total number of accidents (including fractures) treated in th country's hospitals in 1935 was 1,303,478. Of this number 1,166,758 were treated as out-patients only and 136,720 as in-patients—10 per cent. of the total. Th number of new fracture cases in this year was 204,738, i.e., 18 per cent. of th whole accident total (Final Report of Interdepartmental Committee, 1939).

If an accident service is to adopt a catholic attitude to its admissions, one unexpected factor deserves attention, i.e., the great number of serious fractures of the lower limbs from trivial injuries amongst the aged, particularly among women. The full solution of this problem demands an unexpectedly high propor- tion of female beds for long-stay patients. In the treatment of these old patients, highly skilled nursing is essential. Also of major importance are the accidents due to burns and scalds.

The full solution of this problem requires special facilities. Burns, particularly severely burnt patients, cannot be adequately treated in the general wards of a

ospital. The dressing, nutritional, surgical and nursing needs of these crippling injuries require special care (Med. Res. Coun., 1944). In Birmingham, plans have een put in action for dealing with the problem of approximately 300 severely burnt atients each year by segregating a self-contained unit of 32 beds within the ccident service. This unit has its own dressing station suite, saline bath unit, hock ward and metabolism ward. It has a special surgical team, skilled in the reatment of burns and in the technique of skin replacement at the earliest oppor-"·"·y (Colebrook, 1945).

ADMISSION, OUT-PATIENT AND REHABILITATION DEPARTMENTS

inety per cent. of the work of an accident centre is concerned with the treatment f ambulatory patients—the common injuries which do not require in-patient reatment (except in some cases for a few hours). Even the 10 per cent. severe actures, soft tissue injuries (including burns), visceral and head injuries, which equire in-patient treatment, will eventually attend as ambulatory patients, for reatment in an accident centre continues until the patient is returned to a useful ivilian occupation. The admission, out-patient and rehabilitation departments herefore become the key structure of an accident centre.

There is a tendency in hospital organization for some departments to draw away rom the main purpose of a hospital. Re-attending out-patients may be lost in ome still back-water until they are found a year or so later, still quite happy, but till attending for massage or for a bottle of medicine!

In an effort to prevent the development of these quiet waters, the admission, ut-patient, and rehabilitation departments can with advantage be built as one unit. hen the members of the staff and their patients can see quite clearly the plan of reatment: the link between plenary surgery, out-patient re-attendance, rehabilita-ion and the final re-settlement back to work. The Birmingham Accident Hospital ad not the advantage of being built as a new structure, yet it has captured within he walls of a very old building this essential conception (fig. 1 and 2). The plan hows the arrangement for any large accident service adopting this principle.

The ground floor is divided into three sections:—

Section A.—This is a self-contained unit for the admission of all fresh accidents rom the street. The staff for this unit—surgeons, anæsthetists, nurses, radio-raphers—are during their spell of duty confined to the work of this department, which must obviously provide a twenty-four hour, seven day a week service. The acilities provided are:—

(1) A shock room for the resuscitation of the severely injured immediately on admission. This room is separate from the busy work of the main admission block.

(2) Eight separate cubicles for the private examination of each injured patient.

(3) An X-ray unit for the immediate examination of suspected skeletal injuries. This unit includes mobile apparatus which can be taken to the patient's cubicle.

(4) A suite of three intercommunicating theatres: two for soft tissue injuries and one for the reduction of fractures and their plaster or splint immobilization.
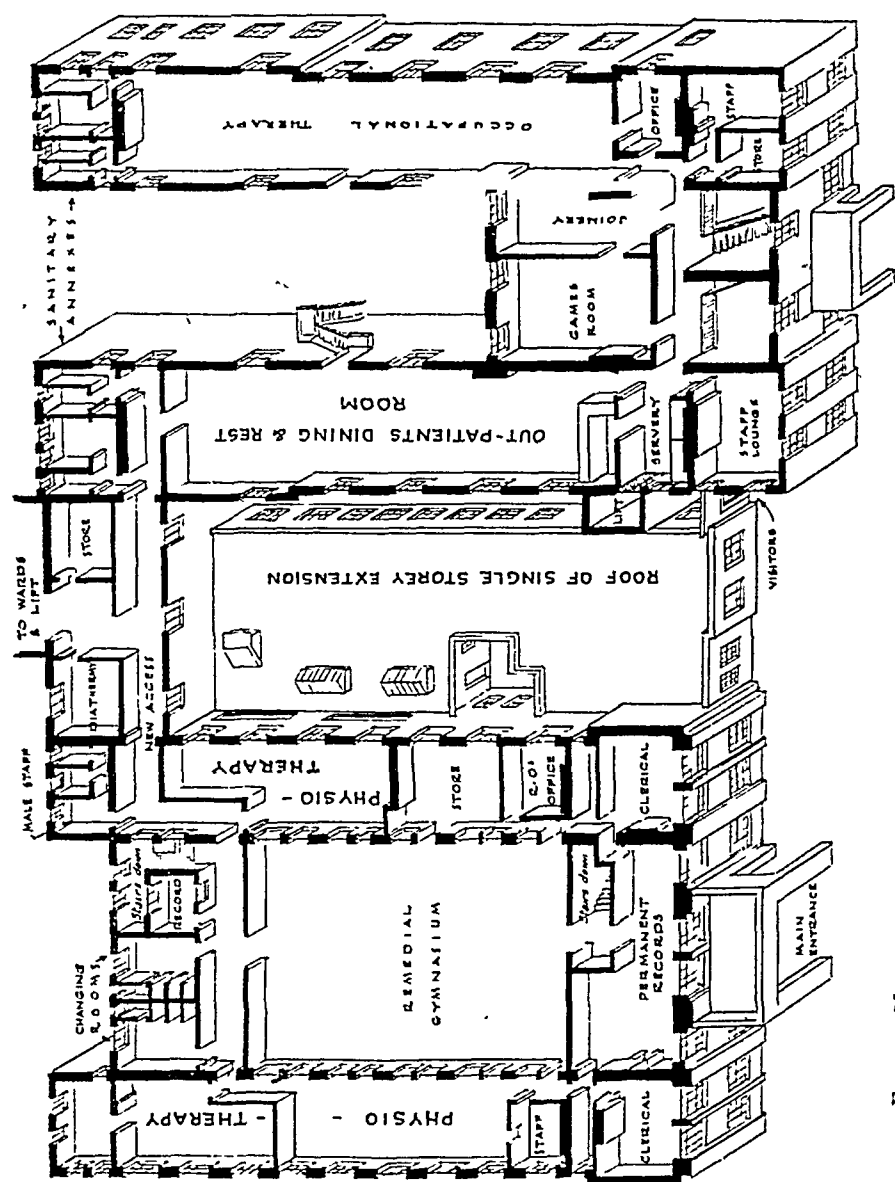
FIG. I. Upper or first floor view of what were two separate buildings now remodelled to form

FIG. 2.   Lower or ground floor view of Admission and Out-Patient Department.

This unit is responsible for the plenary surgical treatment of over 80 per cent. of the work of an accident service.

The more serious injuries receive their examination in this unit but are passed through to another surgical team to receive their operative treatment in a main theatre block located elsewhere in the hospital, and their subsequent treatment in the wards before their return to the ambulatory phase of treatment.

Sections B and C are two self-contained units for the after-care of patients who have already received treatment, either in the admission department A or in the wards of the hospital.

Section B.—This is concerned with the surgical care of all fractures during the healing phase, the surgical supervision of major injuries during the ambulatory phase of their treatment, and the examination of old accident disabilities referred for treatment to the hospital. It consists of two large examination rooms, an X-ray department—the main X-ray department of the hospital which is common to this unit and to the ward patients—and a large plaster room for the removal and re-application of plaster splints.

Section C.—This is concerned with soft tissue injury re-dressings for patients previously treated in the admission unit or in the wards of the hospital. This unit contains a large examination room where a surgeon sees all patients attending the unit. Immediately connected with the examination room is a suite of six dressing units, contained in three dressing theatres. Strict aseptic dressing technique in the treatment of open wounds and the prevention of cross-infection has already been sufficiently emphasized elsewhere (Med. Res. Coun., 1942). The detailed planning of this suite of rooms is therefore of major importance (Gissane, Miles and Williams, 1944).

The attendance of patients at this unit, using an infrequent dressing routine, can be expected in any large accident organization to number between 150 and 200 each day.

One point in the plan needs explanation, namely, the comparatively small size of the waiting hall. This economy in space is possible only by the adoption of an appointment system for all re-attending patients to sections B and C and the rehabilitation department. An appointment system has additional advantages—it saves the patients' time and is looked upon favourably by employers, for many ambulatory patients are at work while under treatment.

Rehabilitation department.—A main feature of the plan of the rehabilitation department is that it is closely connected with the main surgical unit. It is on the floor immediately above sections B and C. A second feature is the close approximation of the various units of the department—strict physiotherapy is side by side with the more active forms of rehabilitation methods undertaken in the gymnasium and occupational therapy department. Intimate and coordinated work of the various units within a rehabilitation department is essential and this can be considerably helped by physically linking these units together in planning the department, and in attaching the whole to the first essential stage of rehabilitation, i.e., good surgery. The final test of good surgery is good functional recovery, and the plan of the accident service should give facilities to this end.

Almoner's department.—One other department of major importance needs

description—the almoner's department—the hospital welfare service. This is above all else a service to patients, meeting some of the domestic and employment difficulties of patients, correlating and implementing when necessary the work of various organizations outside the hospital service already established to meet this need.

In an accident centre dealing almost exclusively with workpeople, the almoner's department makes the direct personal contact between the accident centre and the workers' employers in the direct re-settlement back to work at the end of hospital treatment, when this is possible.

If a course of vocational re-training is necessary, the contact between the almoner's service is direct with the officials of the Ministry of Labour.

The importance of this direct contact between the hospital and outside services in the direct re-settlement of patients back to normal employment cannot be over-emphasized.

INDUSTRY'S COOPERATION

No accident service can really carry out its full programme without the cooperation of local industry in the final re-settlement back to normal work of its patients. Modern rehabilitation methods can go a long way in changing a hospital patient into a useful workman, but they cannot go the whole way. Much can be done, by establishing personal contact between the hospital almoners and the welfare services and personnel management within industry, in finding the right job for a temporarily disabled person, and by gradually up-grading that job until the patient reaches his maximum efficiency. There is also the now tested and proven efficiency of rehabilitation workshops within industry itself (Gissane, 1945). Here the disabled worker, again at the right stage of his recovery, is set to work on production machines on which he does the necessary repetition exercises to regain the range, the power and the speed of movement required by work in normal employment. Having regained that efficiency the worker is at once transferred back to normal work.

The challenge to an accident centre is to cooperate closely with industry and with the new schemes of the Ministry of Labour (1944) in the re-settlement of the disabled back to work. Industry and the Ministry of Labour are real partners in any full programme of rehabilitation and re-settlement.

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leisure hours children are permitted to career on home-made toboggans down tempting slopes which lead into main roads used by buses and other heavy motor traffic.

It is doubtful whether the most insistent repetition of warnings can meet this particular difficulty of the heedlessness of danger of children who are absorbed in play, without adult supervision, particularly in the case of very young children, who because of their youth are unaware of the danger, or of mentally backward or maladjusted overactive children.

A patient of mine, an intelligent small boy of eight years old, recently ran out of a school gate, past a stationary vehicle which obscured his view of an oncoming bus. He was so startled that he dropped the ball which he was carrying; but his immediate impulse was to stay and retrieve it. In picking up the ball he tripped and fell, so that the bus could not avoid him. Fortunately he was in no way injured, and he described his adventure to me. His first impulse was to scramble out from under the bus and to run away; nor did he find the courage to tell his mother until some time had elapsed. On the whole he appeared more concerned by the fact that he had got into a scrape by breaking the rules, and might be punished for this, than by the fact that he might have been badly hurt.

This story shows not only the need for supervision in addition to training, but also serves to illustrate the need for making the training such that the child can grasp the reason for it, intellectually. If training in behaviour on the road is merely grasped as another restriction on freedom it will be disobeyed when supervision is lacking. If it is not made clear to a young child that playing with fire is forbidden because the fire will hurt him, the word "naughty" will be no deterrent to experimenting with it when there is no adult there to save him from the consequences of his curiosity.

TRAINING OF THE CHILD

Direct appeal to the child.—Educational methods which appeal only to adult disapproval or to fear regarding personal safety are likely to have purely negative results. Therefore a successful system of training must make an appeal to the more constructive side of child nature—that is, the delight in doing and in excelling at his tasks.

To some children who have been handled by their parents in a rather negative manner, disobedience about injunctions for their safety on the road is as good an opportunity for asserting themselves and essaying a trial of strength as any other.

An intelligent small boy of six, who was a problem to his mother on account of his unruly and negative behaviour, never failed to wrench himself free from her grasp just as they were about to cross the road. The treatment for this was smacking and nagging. The effect on the small boy was nil, and upon the mother nervous exhaustion, but he responded instantly when at our suggestion she showed him that it was not "grown up" or clever not to be able to cross the road without causing an accident, and that he should show his little sister when it was safe and set her a good example.

That the factor of rebellion against authority does play a part in the conduct of children on the roads, as elsewhere, was pointed out by a police officer who was studying "Safety First" training. In one district a reference to the gratifying decrease in the appearance of the dangerous game of "last across the road" had actually led to a renewal of the practice.

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THE TRAINING OF CHILDREN IN ROAD SENSE

By MURIEL HUGHES, M.B., Ch.B., D.P.M.

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THE training of children of all ages in "road sense" is only one of many measures which are recommended as means of combating the problem of the danger to life on the roads of this country. "Road sense" or "traffic consciousness" is not so much a subject which can be taught in a curriculum, as a desirable attitude of mind towards the question of safety, and controlled and considerate behaviour on the roads. This attitude can, and must, be brought about by unremitting care and effort on the part of all those who are responsible for the care and education of children. This responsibility is shared by many bodies of people, namely, other road-users, teachers, the police, and last, but not least, the parents of the children themselves.

The first essential in imparting any desired attitude in children is awareness and willingness on the part of those of mature years in the child's environment to submit themselves to discipline. In other words, the surest way to acquire an attitude is to grow up with it. It is clear, then, that the importance of road consciousness in the rising generation cannot be over-emphasized.

A study of the statistics of accidents on the roads, as published by the Royal Society for the Prevention of Accidents—or the Chief Constable's reports of any of the big cities—reveals a serious state of affairs. So startling are the figures regarding premature loss of life, efficiency, and happiness, that the comparative lack of public alarm on the subject is somewhat astonishing. This apparently apathetic attitude is perhaps accounted for by the gradualness of the development in speed, number, and bulk of the vehicles which frequent the road: also by the scattered nature of the incidents, and by the fact that the responsibility for them is shared by a number of people, often enough by the victim himself.

It is strange that whereas a comparable loss of life on the railways, or in the coal mines, would undoubtedly have given rise to a public outcry, the daily toll of life on the roads was accepted as inevitable, until the enormous increase of fatalities in the years between the two wars led to the Road Traffic Act of 1934. As a result of the increased traffic regulations and the stimulation of interest in the question of road safety there was in the succeeding years an appreciable reduction in the number of road accidents, in spite of an increase in the number of vehicles upon the roads.

PROTECTIVE MEASURES

Among the many considerations of the Interdepartmental Committee, 1936, (Board of Education and Ministry of Transport) was that of giving instruction

to children as part of their regular education. During their deliberations, the Committee emphasized repeatedly that the problem of road safety is the concern of everyone, and that in order to meet the problem, both protective and educative measures must be taken. It was also emphasized that without the close cooperation of all road-users these measures could not be as effective as they should be. There is a tendency for too much reliance to be placed, especially by parents, on the work done in schools.

The main responsibility for avoiding accidents still remains with the drivers of the lethal machines, and this fact should not be forgotten in directing the main emphasis of propaganda towards the young victims, even though they may frequently be the cause of accidents.

To meet the need for coordinated effort between the bodies responsible for the maintenance of roads, the control of traffic upon them, and the schools, the establishment of "Children's Safety Committees" was recommended with a view to securing a unified survey of the problem in each locality, and concerted action for its solution. Through these branch committees of the Royal Society for the Prevention of Accidents a close cooperation has been obtained between the police force and the Education Authority. The Chief Constable and Director of Education hold office on the committees, and the police force and the teachers are also represented.

This cooperation is of great importance, since without it there could be no continuity of training. One of the most important factors in education is the securing of practical demonstration of the influence of the instructions given. Faults must be corrected as they occur, otherwise they are repeated.

The police bridge the gap between school and the outside world by guiding the children in the streets and furnishing information regarding local problems and danger points. Often a police officer stands on guard outside schools—particularly those situated near main roads—at the school-leaving hours. In many authorities the association of the police with the children regarding education in behaviour on the roads goes much further than this.

Briefly, the position is that prior to the war the combined influence of protective measures and safety training had reduced accidents to children to the lowest known level in the last year of peace, but during the war years this improvement has been lost. Owing to the complexity of the causes to which accidents may be attributed, it is difficult to produce scientific evidence regarding the exact effects of training. (In this connexion it is of interest to record that experiments are at present in process of being carried out.) Nevertheless, it is fair to record that in localities where training has been undertaken the results have been good. For example, in the City of Salford, pioneer work was done by the Chief Constable, Major Godfrey, in collaboration with the Education Authority (Godfrey, 1938). Many protective measures were introduced and safety training and propaganda were intensive—with the result that in 1936 twelve months and nine days had elapsed without the incidence of a single fatal road accident to a child. This striking result was obtained in a city which is the most densely populated area in the country outside the metropolis, and in which the main streets, forming, as they do, one of the main highways to the north, carry all day long a dense stream of heavy traffic.

Such encouraging results seem to indicate that although the growth of highway traffic had outstripped the provision of adequate roads and safeguards, yet the failure of the community to adapt itself to new circumstances was only temporary, and that the position could be materially improved by a well-thought-out scheme of safety training. To be successful, any such scheme must be based upon a sound analysis of the extent to which, and the reasons why, children are involved in accidents; also upon a shrewd knowledge of the dynamics of children's minds and the best ways of appealing to them. The scheme must also be backed up by adequate protective methods and by vigorous propaganda.

STATISTICAL EVIDENCE

The extent to which the number of road accidents has grown during the last thirty years is shown by the Registrar-General's Statistical Reviews. In 1903 the number of children killed in England and Wales in accidents of all kinds was 5,695. Of these, 437, or 7·65 per cent. of the total, were killed on the roads. In 1896 and 1894 this percentage was much the same (Interdepartmental Report, 1936). In 1933 the total number of fatalities to children from all causes was reduced to 3,076, of which 1,245, or 40·47 per cent., occurred on the roads. Thus, in spite of a decline in the total number of fatal accidents, the number from road accidents is almost trebled.

The following is an abbreviated table from the Registrar-General's Statistical Review for the years 1920 to 1933. It is concerned only with fatal road accidents to children up to fifteen years of age:—

YEAR	AGE Under 5 years			AGE 5 and under 10			AGE 10 and under 15			TOTAL under 15
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	
1920 ..	140	70	210	324	123	447	160	40	200	857
1925 ..	208	90	298	293	124	417	195	37	232	947
1928 ..	239	136	375	436	230	666	211	52	263	1,304
1930 ..	255	151	406	471	229	700	257	70	327	1,433
1931 ..	239	150	389	408	224	632	193	66	259	1,280
1933 ..	218	122	340	389	228	617	230	58	288	1,245

The significance of these figures is made clear by the following points from the analysis of the report:—

"Of the total number killed on the roads, 20 per cent. are children under 15. Children between 5 and 15 years of age constitute 16 per cent. of the total population. It is therefore clear that the incidence of accidents to school children is disproportionately large in relation to the total population."

By far the greatest percentage of child victims of road accidents are pedestrians.

Age incidence.—A more detailed analysis of the ages at which fatal accidents occur to "child walkers" indicates that the accident rate rises rapidly from the age of two years onwards, is highest between the ages of four and eight, and highest of all at five to six years. (The majority of children start school at five years, although many are attending Nursery School as young as three years.) After the age of eight

there is a slight decline; but after twelve years there is a further increase, which I been shown to be due largely to accidents to child cyclists.

Sex incidence.—At all ages more boys than girls meet with accidents on the roa This is particularly true from the age of ten to fourteen years, and may possil be accounted for by the fact that girls are more likely to be engaged on domes duties. It is much more likely to be due to the fact that girls being the futu mothers and guardians of the race are naturally more cautious as regards perso safety than boys, who are inclined to be adventurous and impulsive. In my ov experience in Child Guidance Clinics, all of the children who to my knowled have been involved in street accidents have been boys. Incidentally, more bc than girls are the owners of bicycles. Boys, too, are more frequently employ delivering newspapers or milk, and use their bicycles for this purpose.

The figures quoted deal only with fatal accidents, but the number resulting injury may be regarded as approximately thirty times the number of fatal acciden

The time factor.—Examination of records and graphs shows that the time of d also plays an important part in the incidence of accidents to child pedestria The peak hours vary in different localities, but the usual peaks are from 12 noon 1 p.m., from 4 p.m. to 5 p.m., and from 6 p.m. to 7 p.m. The last is probal more closely related to the motorist than to the child—being the time of day wh homeward-bound traffic is heaviest.

It is possible that the earlier figures depend upon the behaviour of children leaving school. There is certainly a diversity between the accident rates of childr on their way home from school and those on their way to school between 8 a 9 a.m. and 1 and 2 p.m.

THE PERSONAL FACTOR

Children's behaviour is certainly more impulsive and less controlled when the is an absence of adult supervision, and it is not impossible that their behavic reaches a high pitch of exuberance and inconsequence on being released fro two or three hours of discipline and restraint. This is comprehensible when it realized that the whole of education is an unremitting effort on the part of t educator to subdue the natural instincts of aggression and self-gratification, as w as to impart knowledge, which few children regard as a pleasurable exerci Small wonder therefore if the progress to school is more cautious and decorc than when freedom calls and the child is on pleasure bent.

The presence of a police officer or a teacher on guard when children are leavi the school gates is a usual protective measure, and later statistics indicate tl whatever methods have been employed the results have been positive. The Rep on "War-Time Fatal Road Accidents to Children" (Bulletin 15) states that co paratively few children have met with mishap on the way to or from school. T vast majority of accidents have occurred while the children have been playing the streets, or out on pleasure. Here the emphasis is on lack of adult supervisi and the responsibility of the parents. Over 88 per cent. of the mothers of pedestri victims were employed on household duties, and only 7 per cent. in factories other war work. The efforts of police and school teachers are fruitless if duri

life. Just as most little girls play at being housewives and mothers, so do children enjoy using toy motor cars and traffic signals to demonstrate their ability to imitate grown-ups as drivers and to solve road problems according to the accepted code. All these methods of training have the advantage of avoiding a negative attitude towards the problem. Instead of a constant repetition of the warning "Do not" —so destructive of confidence when the reasons are imperfectly understood— the children are given an opportunity to show how sensible they can be and the situation is deprived of any element of grimness or horror.

These educational methods cover a wide field and a number of age-groups. War-time Nurseries and Nursery Schools, which are dealing with children at the most dangerous age from the point of view of their safety, include models, pictures, and apparatus for teaching their little pupils the elements of "road sense." One traffic department issued a sheet of drawings for the younger children to take home and colour. They achieved an immense popularity, being concerned, as they were, with Snowwhite and the Seven Dwarfs, each with a road sense slogan attached.

Essay competitions are a useful way of testing the reality of knowledge and grasp of the problem. A successful feature was a "Road Sense Quiz" which was broadcast in the Children's Hour and was run on the lines of the Brains Trust. These tests have the added usefulness of revealing possible gaps in training as well as achievements.

The older child.—In considering the older children such factors as the condition and care of bicycles, if they are allowed to come to school on them, have to be remembered; and, in order that teaching may not grow stale with much repetition, now is the time when the more intelligent children may be given a chance to take some real responsibility. The idea of "road prefects" has been tried, with some success. Since their introduction in the City of Salford there has been a reduction in accidents to school children. These prefects are carefully chosen, and their function is to be at all times an example to others in general conduct. The duties include the supervision of younger children on the roads, the noting and reporting of defective cycles, also the care of babies found unattended on the pavements. This idea combines the advantages of developing the older children's sense of responsibility and keeping their own training fresh in their minds, with that of being an additional means of safeguarding the younger ones.

Play centres.—All these ideas, however effective they may be, only deal with a fraction of the problem. It must not be forgotten that, particularly in congested areas, the vast majority of accidents to children occur during the hours when they are at play and are not in any way connected with school; furthermore, that no amount of training will eliminate the fact that, in the natural course of events, fast-moving traffic and children cannot both exist in areas where many congested streets open straight on to main roads with no safe spaces for the children to play in, without their coming into conflict. If fast-moving traffic is essential, then steps must be taken to place safeguards between the children and the traffic. Such steps may include safety devices on the roads, such as guard rails, warning signs, or the provision of "play streets" and play centres, but this latter plan, again, throws the work and responsibility upon the schools, since most play centres exist in school buildings.

THE FUTURE

Propaganda addressed to all ages and classes of people must not be neglected —it can reach the public through the local newspapers, cinemas, hoardings, and through organized efforts like "Safety Weeks." The basis of success lies not with one individual section of the community, but rather in an integration of them all. However, this article deals with the training of children in road sense. After some years of concentrated application to the problem it should be possible to judge by results whether or not such work has been on the right lines.

During the years 1928–1935, when "road sense" training was under survey in the City of Salford, the total figures for accidents in Salford were:—

1928	..	..	..	730	1932	..	..	..	564
1929	..	..	..	685	1933	..	..	..	477
1930	..	..	..	641	1934	..	..	..	420
1931	..	..	..	608	1935	..	..	..	395

(Godfrey, 1938)

It is therefore clear that the results of combined educative and protective measures are positive. The experience of the war years indicates that this improvement cannot be maintained without unceasing vigilance and attention to detail, and the fact still remains that the result is not good enough. There is a great need for increased expenditure on improvements to roads and lighting, and increased attention to the efficiency and considerate conduct of all road-users. No matter how efficient are the results and training of the younger members of the community, no scheme can include the toddler or the backward child who is incapable of being responsible for his own safety—nor can old heads be placed on young shoulders.

Much of what the future holds depends upon town planning, and the ability to plan, as far away as possible from the residential areas, highways suitable for carrying the multitudes of vehicles which have become a necessity to modern life.

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ROAD ACCIDENTS: SOME MEDICO-LEGAL PROBLEMS

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A FULL study of all the medico-legal aspects of the traffic accident w̸ make a long book. Present space only allows short notes on a few of the p͏ of law which tend to recur in practice.

First, no medical practitioner is legally bound to attend a victim of a ͏ accident. If, however, he does so, he is bound to use reasonable skill and ͏ even if he is attending for no reward; and this duty continues until the patie͏ his friends have had a reasonable chance to call in another practitioner, or patient no longer needs his services.

OBSERVATION AND RECORD

Road accidents have this peculiarity: that judicial inquiry or litigation is practi͏ always lurking in the background. The practitioner attending an accident v͏ must therefore prepare himself not only to render assistance, but also to ͏ evidence. He must pay attention to both these aims together, and they are always harmonious.

On arrival at the scene of an accident he would do well to inquire with s care into the way in which the collision happened. He will probably no͏ questioned directly about these facts, but the knowledge may help him in for͏ an estimate of the patient's condition. He is, of course, immediately conce͏ with any factors in the patient which may have caused the collision. Remembe͏ the probability of litigation he should keep careful notes. Similarly, the me͏ officer who first sees an accident victim on arrival at hospital should take accurate history and make a full record. If, as is probable, he is a junior, he sh͏ call a senior officer to see a serious injury, especially of the head or vital org͏ The first examination may largely decide the treatment and compensat͏ A careful history may detect an injury that existed before the accident, and pro͏ a defendant from an unjust claim.

An *X-ray examination* should be performed as soon as possible, not only͏ the better diagnosis and treatment of the case, but also because its informa͏ will probably be valuable when compensation is being discussed. The practitio͏ in charge of a road accident victim runs a grave risk if he omits to advise X-͏ examination, for if the patient is able later to show that an injury was mis͏ which X-rays would have revealed, he may make good a claim for damages.͏ the patient refuses to have an X-ray examination, the practitioner should in͏ upon his signing a written note of refusal, and record the suggestion and the ref͏ in the file of the case.

Post-mortem examination.—If the patient dies, an accurate autopsy may͏ extremely important in later proceedings.

A pedestrian hesitated in front of a car and stumbled; the car knocked him down ͏

illed him. Obviously his death resulted from the collision. But the post-mortem examination showed that he had a small cerebral hæmorrhage due, not to injury, but to disease. By an extraordinary chance the vessel had ruptured as he was crossing the road, and he had become unconscious before he was hit.

Such a finding might save a motorist from imprisonment for manslaughter.

To take another, and a hypothetical, case:—

A car, wildly driven, collides with a lorry; the lorry driver is injured and the car driver is picked up dead. Autopsy shows that the accident was caused by the sudden death of the car driver at the wheel from syncope due to an unsuspected lesion. There has been no negligence, so the dead driver's estate is not liable.

No autopsy in the case of a road accident should ever be performed without the coroner's consent.

THE RECOVERY OF FEES

A practitioner called to attend an unknown person injured in a road accident is placed in a troublesome position. He can hardly help feeling morally compelled to do all he can to save life and ease pain, but he cannot feel at all sure that he will be suitably rewarded. A bystander runs to his surgery and asks him to come to the scene of the accident; or an injured person is brought and laid on his premises. He gives what treatment he can, applies bandages and perhaps splints, and arranges for the patient to be taken to hospital. Now, although technically a bystander who asks the practitioner to help is probably liable to pay his fee, such liability is often not at all easy to establish in court. The practitioner may find it impossible to persuade the bystander to disclose his name and address, and, even if he can trace the man, his account will probably be rejected and a county court action will not seem worth while. If the patient is unconscious, he cannot be made liable for the practitioner's fee, for he never asked for his services, and no policeman or bystander has any authority, even implied, to pledge his credit. If a friend or relation be present, however, he has in the circumstances implied authority to contract for treatment on behalf of the patient and to give consent to the personal interference.

If the patient is conscious, the practitioner should ask if he consents to treatment, explaining shortly what he proposes to do. There is a double reason for doing this: it creates a contract, and it protects the practitioner against an allegation of unlawful interference which may later be made an excuse for not paying his fee.

If the practitioner thinks the patient should go to hospital and the patient is conscious, he should inquire whether he wishes to go or not. No-one may be sent to hospital against his will. If the patient is unconscious and alone, his consent may safely be presumed to any reasonable course of action, or a relative or friend may consent for him.

An oral promise to pay a fee is binding, whether the patient makes it or anyone else. If, however, the practitioner should ask at some stage "Who is going to pay my fee?" and someone should answer, "If you can't get it from him (the patient), I'll see you're paid," that undertaking as it stands cannot be enforced at law, because it makes a contract of surety or guarantee, which is one of the kinds of contract that must be proved by signed writing. The practitioner may be content to trust the guarantor's honesty, but he would do well to take an early opportunity of getting him to sign a written undertaking.

Consultants' fees.—A practitioner attending a seriously injured person may desire to call in a consultant. Unless, however, he obtains the patient's express consent, explaining the need and the possible cost, he becomes liable for the consultant's fee. If the patient is unconscious, a relative or friend may give valid authority. A consultant summoned in such circumstances will therefore do well to inquire who is being responsible for his fee.

A consultant's right to remuneration may depend, oddly enough, upon the place to which the patient is brought. An accident victim taken to a voluntary or municipal hospital and placed in a public ward is entitled, like any other patient in the same ward, to free treatment. That position may seem logical, but it means that even if, as often happens, some negligent motorist is liable to compensate the patient and is supported by an insurance company, the consultant who treats the patient cannot claim a fee. If, on the other hand, the patient is taken to a nursing-home or to the private ward of a hospital, the practitioner may claim his usual fee from the patient, and the negligent motorist and his insurance company are liable. It seems all wrong that insurance companies should be protected in this way at the expense of the unfortunate consultant, but that is the position.

HOSPITAL FEES

Voluntary hospitals come off badly in their dealings with the road victim. Parkes (1939) estimated before the war that the treatment of these patients cost them £300,000 a year and they only recovered £100,000 from the insurance companies. Apart from an inadequate statutory compensation, they have no legal claim on anyone. The Road Traffic Acts allow 12s. 6d. for emergency treatment; and when —and only when—the patient or his dependants have received some payment under an insurance policy, the company must also pay the hospital in respect of the patient's treatment up to a maximum of £50 for an in-patient and £5 for an out-patient. This is in practice an absurdly small maximum, apart from the difficulty of getting it.

In fairness, a part of the compensation due under the third-party insurance policy which every car-driver must hold ought to be earmarked by law for the voluntary hospital.

Municipal hospitals are better off, because they are empowered by law (Public Health Act, 1936, s. 184) to charge patients a reasonable sum for maintenance and treatment, and the patient may include such a charge in his claim on the negligent motorist. If compensation is not available to him, however, the hospital may not be able to obtain much payment from him.

EMERGENCY TREATMENT

To provide practitioners and hospitals with at least some return for their services, the Road Traffic Act, 1934, gives a medical practitioner who is summoned in an emergency to treat a person injured in a motor accident and requiring immediate treatment, the right to recover a fee from the person using the car involved. This fee is 12s. 6d. for each patient and 6d. a mile for any distance over two miles which the practitioner has to travel, in both directions. Only the first practitioner rendering assistance can claim the fee. If he has not noted the patient's name and address at the time, he may demand from the chief officer of the local police,

as of right, any available information about the index marks of the car and the identity of the user. He may claim his fee at the time, orally, from the user of the car; otherwise he must request it within seven days in writing signed by him, stating his name and address, the circumstances in which he gave the treatment, and the fact that he was the first to give it. He may deliver this request into the hands of the user, but if he posts it, he must *register* the envelope or the request is invalid. He should not send it to an insurance company or to an employer. If he does not receive satisfaction, he should ask his defence society to support him. A hospital whose medical officer gives first aid is in the same position as a private practitioner.

The receipt of this statutory fee does not bar the practitioner from charging the patient the "reasonable" fee to which he is entitled at common law. He should always send the patient an account on his usual scale, even if the patient seems to have small means. With luck, the motorist's insurers will pay; if they do not, the practitioner may see fit to reduce his charge to a needy patient.

WITNESSES AND THEIR REMUNERATION

The obligation to give evidence in legal proceedings is perhaps the most trying aspect for the medical practitioner of this trying part of his practice. He will save himself much trouble if he accepts it from the outset, and arms himself by keeping adequate notes and records and by acquainting himself carefully with every fact of the case. The giving of evidence is, after all, a valuable service to society, and one which in this particular field he alone can render. If he applies his mind conscientiously to the task of impartially helping the court to find out the truth, he need fear no loss of credit, but he must resign himself to some loss of time and profit.

Either side may summon him by serving on him a subpœna summons, which is a writ issued by the court which is to hear the case. It requires the witness to attend at a certain time and place, and may direct him to bring certain documents. "Service" is presenting the witness with a copy of the writ and showing him the original. To disobey a subpœna is contempt of court, punishable by fine or imprisonment, and may also give ground for a civil action. It is, however, a good defence to prove illness or inability to travel, or that the witness believed in good faith that he would not be required, or, in a civil case, that he was not given with the subpœna a proper sum for his expenses (conduct money). A medical man may, and should, insist on having his fee as well. If summoned by a criminal court or a coroner, however, he must attend even if he is given neither conduct money nor fee. It is not a good defence to show that the case was called unexpectedly, or that the witness could not give material evidence.

A practitioner is obliged to disclose in the witness box even information he has acquired through his confidential relationship with the patient. If he is called to help his patient's interests, he will of course be telling what he knows with the patient's consent, and be freed from his professional duty of discretion. If he is called by the other side, he may protest to the judge that he is being required to infringe his professional rule, and ask if the court will excuse him. If the judge says he must testify, he had better not expose himself to a serious penalty by refusing. His professional obligation does not force him into this dilemma. On the

other hand, there is no reason why a medical practitioner subpœnaed by h patient's opponents should give them any information before the trial.

Rate of remuneration.—A practitioner who has treated an accident victim w be called as a witness to fact, not as an expert. He is therefore not strictly in position to bargain with the solicitors about his fee, for they can compel him attend and leave him to obtain what he can get; but he may find them willing make an agreement with him. They are not, however, likely to make themselv personally responsible for his remuneration. The scales of payment to witness other than experts were all settled a long time ago and are not very satisfactor Moreover, the fees are not paid out of public funds, and if the litigant has no asset his witnesses may get nothing. A medical witness residing in London and givir evidence there is entitled to a guinea a day; if he lives outside and is called London, he may have three guineas a day and his travelling expenses (*Clark v. Gi* 1854. 1 K. & J. 19). If he does not receive these sums with his subpœna, he ha nevertheless better attend; but he should inform the judge before he takes tl oath that he is still in a position in which his fee can be withheld if his eviden is unfavourable to the party calling him. If the case is settled or given up and tl practitioner does not have to attend court, he must return what money he h received.

In the High Court, when the case is over, the taxing master in assessing tl costs will lay down the proper amounts which ought to be paid to the witnesse If the party liable for the fee does not pay, the witness may sue him for the taxe remuneration or a reasonable sum. A practitioner in this position should ask h solicitor if an action is likely to be worth while—if, even if he wins, it will repa his expenses. The solicitor who called the practitioner is not in the ordinary wa liable to pay him; but he is liable if he has specifically undertaken personal liabilit Also, if he is an "ambulance-chaser" and has conducted the case on a speculativ basis, charging his client only if he is successful, the court might infer that I promised to make himself personally liable. Costs on assize are taxed by tl circuit associate. A practitioner who considers he has not been allowed enoug should consult his defence society or solicitor, who may take up the matter wit the master or associate.

In the county court, witnesses' remuneration is fixed by statutory rule. Medic witnesses are allowed reasonable costs of the double journey and compensatio for loss of time. When the amount at issue is not more than £50, the attendance fe may be between one and two guineas; when it is over £50, between one and thre guineas. Taxation is carried out by the registrar, who has considerable discretion.

The remuneration in criminal cases is also statutory. If the witness lives o practises in the town or place where the trial is held, one-and-a-half guineas a da for giving evidence in the case, and three guineas for two or more cases on th same day, are given. "Town" means municipal borough or urban district, an "place" means a circle of three miles' radius. A witness coming from outside th town or place may have up to three guineas a day for one or more cases. A witnes who is necessarily kept away from his home or business for less than four hours may not have more than half a full day's allowances.

Travelling expenses.—If the witness comes from a distance of over two miles

by train or other public conveyance, he may be given the fare he actually paid. Railway fares, except for special reasons allowed by the court, are third-class, and if return tickets are available only the return rate is allowed. If no railway or other public conveyance is available and one or more witnesses necessarily travel by a hired vehicle, the actual amount of the hire is allowed up to 1s. 6d. a mile each way; but if two or more witnesses attend from the same place, the total allowance may not exceed 1s. 6d. a mile unless the court is satisfied that it was reasonably necessary to hire more than one vehicle. If no railway or other public conveyance is available and the witness comes on foot or in a private conveyance, he may be allowed up to 3d. a mile each way. The court has discretion to allow larger sums to witnesses suffering from serious illness.

If the witness is called by the Crown, he is usually given his expenses and fee on the maximum scale as soon as he is released. If, however, he is called by the accused person, he may not be paid at all, although if he thinks it worth while he may bring an action for the amount allowable by the official scale.

POST-MORTEM EXAMINATIONS

The coroner may, at any time after he has decided to hold an inquest, request any medical man to carry out an autopsy, or make a special analysis or test of parts of the body or anything else which he thinks ought to be tested or examined in order to see how the deceased came to his death. The practitioner may refuse, but if he accepts and is summoned as a witness, he may be asked his opinion on any matter arising out of the examination and on the cause of death. The coroner may issue a subpœna summons, but in practice he often merely sends his officer with a verbal message that the practitioner will be required to give evidence at a certain time and place. Technically this summons is not binding, but the practitioner would be well advised to obey it. The closer the cooperation between practitioner and coroner, the better for all concerned.

Rate of remuneration.—A medical practitioner who has made a post-mortem examination by the direction or at the request of the coroner, or who has attended an inquest in obedience to the summons of a coroner, may be paid as follows (Coroners (Amendment) Act, 1926, s. 23):—

(a) For attending to give evidence at any inquest whereat no post-mortem examination has been made by the practitioner, one-and-a-half guineas for each day on which he is required to attend.

(b) For making a post-mortem examination of the body of the deceased and reporting the result thereof to the coroner without attending to give evidence at an inquest, two guineas.

(c) For making a post-mortem examination of the body of the deceased (including the making of a report, if any, of the result thereof to the coroner) and for attending to give evidence at an inquest on the body, three guineas for the first day, and one-and-a-half guineas for each subsequent day on which the practitioner is required to attend.

No fee is officially laid down for a written report on the probable cause of death deduced from an external examination of the body. Some coroners pay fees varying from 7s. 6d. to 15s. for these "modified reports" (Medical Defence Union, 1935), but the arrangement is a purely local one and a fee may not even be provided for in a bye-law. When a practitioner receives a request from a coroner for such

a report, he must therefore choose whether he will give the information *ex grati* or whether he will first ask for a guarantee that his fee shall be paid. There i everything to be said for performing a service which gives the practitioner littl trouble and may save the coroner a good deal, and which will foster a friendly an cooperative spirit between the coroner and the medical practitioners of his district It is also, as a writer in the *Lancet* (1928) observed, an advantage to a practitione not to have to give evidence at an inquest, and the relatives may well assent t pay the cost of a report which spares them a distasteful and possibly distressin; public inquiry. The practitioner has no claim for the fee on the administrators o the deceased's estate.

The Coroners Acts do not lay down any travelling allowances, but some loca authorities have authorized the payment of travelling allowances to medica practitioners.

According to a decision of a county court judge in the case of *Greig* v. *Nightingal* (see *Brit. med. J.*, 1930, 2, 253), when an inquest is held on more than one bod} at the same time, one inquest is supposed to be held on each body and a medica witness may receive a separate fee for each. This ruling carries no legal authorit} but is probably correct.

Even if a medical witness only gives evidence of the facts relating to the deatl and not an opinion of the cause of death, he is probably entitled to be paid at th medical rate laid down by the Act, for he is being called because of his medica knowledge (*Dalton* v. *Ottaway;* see *Herts Advertiser*, June 24, 1932).

If a medical witness is summoned informally instead of by subpœna, he is never-theless probably entitled to the fee laid down by the Act. This is the official vicw of the Coroners' Society. If, however, a practitioner gives evidence only of non-medical fact, he may only have the fee of an ordinary witness.

"AMBULANCE-CHASERS"

Some firms of solicitors have in the past made a practice of following up victims of road accidents and persuading them to instruct the firm to handle their claims for damages on a speculative basis. Often the agreement is for 10 per cent. of any compensation the firm obtains, and no fee if it fails. The firm usually settles for an unjustly small sum. Such conduct is wholly unethical, and the Law Society makes every effort to stamp it out. The shortage of manpower and civilian motor cars in the war has reduced its incidence, and the relative number of those practising it was never great; but it will doubtless again become a problem when the restrictions on motoring are removed. It affects practitioners and hospitals, partly because such methods are bound to unsettle the patient and partly because lawyers of this class, intent on profit, subpœna medical witnesses and hospital records with far less consideration than do reputable solicitors, and do not give any part of the compensation to the hospital.

Many hospitals use methods which restrict the scope of the ambulance-chaser. Summary dismissal of employees for giving information, systematic warning of patients, and the provision of adequate legal assistance, are the chief. The London County Council has a rule that no certificates may be given, and no lawyer allowed access to the patient without his special request. St. Mary's Hospital notifies

patients that the almoner will help them to legal assistance, and warns them against listening to strangers and signing papers. The chief difficulty seems to have been the relative absence of alternative legal help for poor patients. Hospitals have formed panels of reputable solicitors, but these usually want a payment to cover preliminary expenses, and so exclude the destitute patient. The local Poor Persons Committees benefit the very poor but not those with moderate incomes. Therefore, to a large extent, the ambulance-chaser provides a service which, though poor, is the only one available. Unless hospitals and solicitors together can arrange a better one, or adequate compensation for accident becomes payable under a system of State insurance, the evil is likely to remain. Meanwhile, practitioners can do something by reporting cases to the Law Society.

SOME CONCLUDING REFLECTIONS

The only sensible way to look at road accidents is, surely, not as a series of isolated incidents in which compensation should depend upon legal proof of liability, but as a vast social problem. The community's life depends upon the use of large numbers of motor vehicles. The vehicle which injures a poor pedestrian is in nine cases out of ten being operated indirectly in his interests—for some socially useful' purpose. Drivers, cyclists and pedestrians are all human, all apt to make mistakes. Surely the risk of accident is one which society might recognize as collective, as an incident of the communal life, and therefore one to be covered by a system of communal insurance. Under the present system an injured person can only be compensated if he can prove in court that his injury is due to another person's negligence, or if the other person's insurance company thinks he will probably be able to do so. There has to be either a legal battle or the threat of one. And the legal battle itself is fought in such a tangle of fictions and unpractical rules, and involves so much expense and delay. The victim may have been knocked unconscious in a lonely place, and be unable to bring evidence that the driver was negligent. Potential witnesses may decline to help. The real defendant, moreover, is not the motorist but his insurance company; often the real plaintiff is an insurance company as well. Every soul in court is perfectly well aware of this fact, but no one is allowed to mention it. At the trial, the victim's right to compensation will be determined by fantastic concepts like "contributory negligence" and "last opportunity of avoiding the accident." Finally, even if he wins, the practitioners who have "repaired" him are lucky if they receive an adequate fee, and the hospital where he lay is practically certain to have spent a good deal more on him than it can recover.

The whole idea behind the present system is unreal and unadapted to the situations involved. The whole machinery is obsolete and inefficient. The healing and compensation of road accident victims should be made part of a State insurance scheme. Sociological thought is already moving in this direction, and medical practitioners and hospital authorities can do much to accelerate the process, if they choose.

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ON THE DETECTION OF FREE FLUID IN THE ABDOMEN

By GERALD OVENS, F.R.C.S.

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THE presence of free fluid in the peritoneal cavity may be one of the easiest or one of the most difficult problems in clinical medicine. A large quantity of fluid may be obvious at a glance, whereas small quantities may be recognized only by the most careful examination; yet not infrequently the whole diagnosis and treatment of a patient may largely depend upon its demonstration.

Two signs have stood the test of time, shifting dullness and a fluid thrill, but both of them have certain fallacies and, as usually elicited, a considerable amount of fluid has to be present before they become positive. It will be the object of this article to draw attention to certain points in eliciting these signs and also to mention some other lesser known ones which are often of even greater value in difficult cases.

SHIFTING DULLNESS

The general technique of this test is too familiar to need detailed description but for the difficult case, when only a small amount of fluid may be present, certain points should be borne in mind:—

(1) Time must be allowed for the fluid to gravitate down to its lowest level. Hence it is always advisable to wait for at least one minute after moving the patient before starting percussion.

(2) Always percuss from a resonant area to a suspected dull one. Owing to their thicker muscles, the flanks are always less resonant than the centre of the abdomen. Therefore the sharper contrast furnished by the tympanitic mid-abdomen should be used as the base-line for the test.

(3) Position of the patient. Whether a patient is standing, sitting or lying on his back, the pelvic cavity is at a lower level than the abdominal, and as fluid will always find its lowest level, most of it will gravitate down into the pelvis and so become impossible to percuss. The pelvis may accommodate as much as two or three pints of fluid, and it is only when there is more than this present, when the pelvis is full to overflowing, that it is possible to demonstrate abdominal dullness with the patient in these positions. But if the patient is examined lying on the side, the pelvis is tipped up and a large part of its contents are spilt into the general abdominal cavity. In fact, the more the patient rolls over on to his front, the more the pelvis will empty. Therefore when testing for small quantities of free fluid, start by putting the patient into a modified Sims' position, i.e., half over on to the face with the upper leg well flexed, and percuss as far underneath the patient as possible. If no dullness can be demonstrated in this position, there is no need to carry the test any further; but if an area of dullness can be demonstrated, then roll the patient on to his back, and if now the previously dull area becomes resonant, there must be free liquid present.

FALLACIES.—(1) *Large-bowel obstructions*, whether acute or chronic, often give the sign of shifting dullness, even when there is no free fluid present. The mechanism is as follows:—The distended bowel contains both fluid and gas, and, being in the large bowel, the ascending colon on the right and the descending on the left are fixed to the posterior abdominal wall and cannot vary their position

with movements of the patient. With the patient on his back there will be resonance anteriorly, but far out in the flanks the accumulated fluid in the distended bowel will show itself as dullness. If now the patient is rolled on to his side, the gas in the bowel will be uppermost and the previously dull area will become resonant. Note that this will only occur with large-bowel obstructions, and it can at once be confirmed that the fluid is in the lumen of the bowel by the demonstration of a fluid splash.

(2) There may be plenty of free fluid in the abdomen but no shifting dullness. This fallacy is much rarer, and only occurs when the intestines are unable to float up on to the surface of the fluid and reach the anterior abdominal wall. This may be due to such a gross accumulation of fluid that the mesentery is too short or, alternatively, the coils of intestine may be bound down to the posterior abdominal wall, as in tuberculous peritonitis, and so are unable to float up. In such cases there may not be any areas of resonance and the whole abdomen is dull on percussion.

FLUID THRILL

As usually elicited clinically, this sign is only positive when large amounts of fluid are present, but it is possible to demonstrate even quite small quantities if a special technique is used:—

Once more place the patient in such a position that, so far as possible, the pelvis is empty. Now lay the left hand with the fingers spread widely apart on the most dependent part of the abdomen and exert gentle pressure; the amount of pressure required depends upon the thickness of the abdominal wall. With a thin patient only the lightest pressure is needed, but when there is much subcutaneous fat, then firm pressure is required in order to damp down any thrill which the fat might transmit. Each finger in turn is now sharply percussed; if fluid is present, a thrill will be felt travelling underneath the fingers from one side of the hand to the other. This sign means that there is fluid present underneath the examining hand but it does not by itself mean that *free* fluid is present. In fact, it can always be demonstrated over a distended bladder or other cystic swelling. But if the sign varies with change of the patient's position, or if no localized swelling can be made out, then there must be free fluid.

DIPPING

Dipping through fluid on to a solid structure beneath gives an entirely characteristic sensation and is pathognomonic of free fluid. This test should always be carried out whenever free fluid is either suspected or known to be present, but so far as the fluid is concerned it should be regarded merely as a confirmatory test, as its chief importance lies in the help it gives in diagnosing the cause of the fluid. Normally, no solid viscus is palpable in the abdomen, so that if a mass can be felt beneath the fluid it must be pathological, and may be the cause of the ascites.

FLATTENING OF THE UMBILICUS

Perhaps this is the most characteristic of all signs of fluid in the abdomen and in a typical case may give the diagnosis at sight. Unfortunately it is always evidence of a long-standing accumulation and also implies a considerable amount of fluid. In such cases there is not usually any difficulty in confirming the diagnosis by any of the other tests detailed above.

RECTAL EXAMINATION

Other than by a surgical operation, the shortest route to the abdominal cavity
via the rectum (with the vagina running a close second). Elsewhere, fat and muscle
form a considerable barrier between the examining hand and the abdomin
contents, but in the rectum there are no muscles which can prevent palpation
the pelvic peritoneum and, as this is exactly the site where fluid most readi
collects, it is the most generally useful of the clinical methods for the detectic
of small quantities.

In contrast to the examination for shifting dullness described on page 256, for this t
as much fluid as possible must be collected in the pelvis; hence it follows that the left late
position, the one most generally used for rectal examinations, is contraindicated, as it ten
to empty the pelvis. The patient should be flat on his back and, in really difficult case
it is worth raising the head end of the bed in order to empty the abdomen as much as possib
Although true fluctuation cannot be elicited with a single examining finger, the soft, con
pressible bulge of the anterior rectal wall, felt when there is fluid in the pelvis, is qu
characteristic.

ABDOMINAL VOCAL RESONANCE

With fluid in the pleura, vocal resonance is diminished or lost; with fluid in th
abdomen, vocal resonance *may* be heard well below its normal limits. The explan
tion of this is obscure, but two conditions must be present for the sign to l
positive: the fluid must be in contact with the diaphragm and there must not l
too much of it. Such conditions are not uncommonly present in acute abdomin
disease, as, for example, a perforated peptic ulcer. In such a case the finding
vocal resonance in the right upper quadrant of the abdomen may be a most valuab
sign; so much so, that its absence suggests either a mistaken diagnosis, or el
that the ulcer is sealed off and little or no leakage has taken place.

FLUID IN A HERNIAL SAC

It is always worth examining the hernial orifices in any case suspected of ascite
Fluid may be apparent there when it is difficult to demonstrate it elsewhere in th
abdomen. It gives rise to a fluctuant, reducible swelling with an impulse c
coughing and dullness on percussion. If a patient is known to have a herni
reduce it and then place the patient in such a position that the hernia is dependen
on removing the hand there is a good chance of the fluid finding its way into the sa
instead of its more usual contents.

RADIOLOGY

Occasionally X-ray examination is of considerable value and should always be mad
in obscure cases. A plain skiagram of the abdomen and pelvis is taken with th
patient in the upright position. A diminished translucency of the pelvic cavity
when compared with the normal translucency of the abdominal cavity higher up
on the plate, is always suggestive of free fluid; if, in addition, there is a total absence
of gas bubbles in the pelvis, it means that something is compressing the rectum
and pelvic coils of intestine, and the diagnosis is established.

CHILD HEALTH
X.—THE CHILD GUIDANCE CLINIC
By KATHLEEN M. TODD, M.B., D.P.M.

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DURING the present century considerable advance has been made in the understanding not only of the processes of mental functioning, but of the motivations which lie behind individual human behaviour. Earlier clinical psychiatric studies concentrated chiefly on the adult parent, with retrospective analysis of childhood memories and fantasies; later research has been applied to the child mind itself, and more and more the medical profession is becoming aware that the aberrations of childhood, the nightmares and negativism, the strange fears and moods, trivial though they may seem in themselves, may be the forerunners of graver mental states in the adolescent and adult patient.

In the early days of the child guidance clinic, the larger proportion of children referred were those whose nuisance value was high; the war and evacuation (Winnicott, 1944; Isaacs, 1941) temporarily swelled the numbers of this group, but the last ten years have seen a marked increase in children with personality problems, the over-sensitive, the shut in, the day dreamers, the victims of phobias and obsessions. Since the establishment of residential nursery schools (Burlingham and Freud, 1943) to meet the emergency needs of war, an increasing number of toddlers have come to clinics; treatment through "play" has been further elaborated, and psychiatrists have become more familiar with the psychology and psychopathology of the under-five child (Burlingham and Freud, 1942). In consequence, more toys and sand-trays have found their way into clinics and now no therapist's consulting room is complete without a collection of "play material."

The history of the child guidance movement and its evolution in the United States and England can be read elsewhere (MacCalman, 1939; Wittmer, 1940); space prevents its inclusion in this article, the aim of which is to put special emphasis on the actual methods of investigation and treatment in the clinic, as it is felt that this aspect of child guidance is not as widely known as it might be to practitioners, school medical officers and others. The variety in the organization of clinics under different authorities (Gillespie, 1932) and the function of clinics in training staff personnel must also be passed over.

CLINIC SETTING AND PERSONNEL

Before embarking upon the procedure in an individual case it may be of value to give a general picture of a clinic, its lay-out, its equipment, the personnel of the staff and an account of their individual functions and team work. A minimum of three is essential for the establishment of a clinic; this team consists of a psychiatrist, a psychologist and a psychiatric social worker. All are specialists in their own field and have had a training in the use of child guidance methods, including clinical work in a clinic for a recognized period.

(1) *A child-psychiatrist* is a man or woman who has a medical degree and a

diploma in psychological medicine. This latter should include a practical training in the clinical aspects of the psychoses, which can only be gained by residence in a mental hospital. Without this preliminary training, the psychiatrist has not the necessary background of experience with which to diagnose the wide range of abnormalities he will see in a clinic. He must not, for example, confuse a transient adolescent instability, due to a developmental disturbance or environmental trauma with an incipient psychosis, perhaps of schizophrenic nature. Upon his judgement depends choice of treatment. A suitable therapy for the one may be a disaster for the other. A mental hospital training enables him to recognize, too, the "pre-psychotic" child (Creak, 1939; Lay, 1938), not so much because this child's behaviour fits into no known diagnostic category, but because there is a corre-spondence between the psychopathological content of his mind and that of the adult psychotic. The child's drawings, for example, are often primitive, with a sadistic or dissociated component similar to those of the schizophrenic or depressed patient. An additional advantage is that there is much in common between the irre-sponsible gaiety, the bizarre fantasy, unrestricted behaviour and incoherent thinking of the normal young child and the psychotic, and acquaintance with one enhances understanding of the other. The psychiatrist should also have had training in the psychoneuroses in adults, and experience with physically ill children and with normal children. Without this latter, he may be deceived into interpreting as abnormal the rich and lively fantasy of the young child. There are childish rituals and phobias which are more or less normal, and others which have profound symbolic or fetishistic value. To strike a balance, the psychiatrist should be as conversant with the vagaries of normal childhood as is the wise parent, or an A. A. Milne!

(2) *The child-psychologist* has had a preliminary training in teaching, he possesses an honours degree in psychology or the equivalent; he (or she) should have a knowledge of educational methods, and it is essential that training in intelligence testing should take place in the team work of a child guidance clinic. He, as well as the psychiatrist, should have that psychological insight without which no-one can explore the minds of others. Many psychologists work part-time in the clinic and part-time in the schools, establishing a necessary link between the two services and advising school staffs on the selection of suitable cases for reference to clinics. Adequate selection rests of course not only on the psychologist, but also on the teachers, school medical officers and health visitors and all those dealing with children. Ability to detect personality deviations varies but can be improved by study and discussion and, best of all, by enlightened observation of children.

(3) *The psychiatric social worker* is the holder of a social science certificate, or a recognized equivalent. She has had experience in general and medical social work, care committee work, settlement work or housing experience. This is followed by a year's training for the certificate of the mental health course, which includes practical experience amongst adults and children in a mental hospital and a child guidance clinic.

This is the team. Their setting is a group of rooms sufficient in number for private interviews, each room to have the maximum of light and space and the minimum of furniture and fittings. In all modern child-psychiatry, "play" is an integral part of treatment, so that toys, a dolls' house, and a sand-tray and water

will be part of every therapist's equipment. The rooms should not be too clean and orderly, so that the child patient, although he is not allowed to destroy either, the clinic structure or its contents, may express himself as freely as is possible.

PROCEDURE OF INVESTIGATION

How does the team work? What is the procedure by which the child's problem is elucidated?

The social history.—The small patient comes with one or both parents, usually the mother, and if the social history has not already been taken by the psychiatric social worker in a home visit, she interviews the mother while the child is with the psychologist and later with the psychiatrist. The method of examination is best illustrated by means of an actual case:—

Leslie is a sensitive, thoughtful-looking boy of twelve, suffering from a phobic fear of school. He is an only child, who lives with his parents in an upper self-contained flat. His mother is a capable, shrewd woman with a stable outlook on life, but inclined to over-protect her only child for fear of a mental breakdown similar to her husband's. The husband recovered a few years ago from melancholia for which he had had hospital treatment; he has always been argumentative, dogmatic and worrying. His illness extended over three years and its onset coincided with Leslie's early school attendance. The mother had had a very happy childhood in a family of children; her husband's early life was frustrated and over-dominated by a nagging anxious mother. He is now a shoe repairer and their shop is on the ground-floor, above which is the flat, their home.

Leslie's early development was comparatively normal, but, from the mother's point of view, marred by a period of temper tantrums which she "cured" at the age of four. He has always been a reserved child, not a mixer; he cannot tolerate rivalry or competition and tends to avoid boys of his age, although he is reasonably proficient at games. He has a mechanical bent and likes to help his father in the shop or tinker with his motor bike. He has never been evacuated nor away from his home for long periods. There has been no truancy or any history of delinquency.

The school history is usually supplemented by the social worker's visit to the school, where she meets the head master and class teacher personally, and hears their report on the child's academic work and his behaviour.

From Leslie's head master it is learned that his school attendance was broken from the start. Screaming fits at school alternated with periods of absence, and latterly there have been scenes: a combination of temper and fright, when the boy kicks, screams, tears his hair and pleads to remain at home. Scholastically he does well, and he professes to like his teachers and his work. These scenes and school absences have of late increased in frequency and severity, and after all other more practical methods had failed he was referred for psychological advice.

In the social worker's case-history particular attention is paid to a child's development phases, his physical illnesses, long absences from home, his attitude to his parents and their real attitudes to him, and any outstanding emotional disturbance in his life and his reactions to them.

The psychologist, meanwhile, has been making an assessment of Leslie's intellectual endowment. Dullness or mental defectiveness may cause a child to shun school work beyond his capacity. A specific defect, such as a reading disability, coupled perhaps with left-handedness and crossed laterality, should never be overlooked in school refusal (Orton, 1937; Parson, 1924).

Leslie, however, is right-handed, has no specific defects and his innate intelligence is well above the average. The psychologist reports that he has an I.Q. of 133 on the revised Stanford-Binet scale and reaches a performance level of sixteen years. He is therefore of superior ability and in every way suitable for a secondary school education. His vocabulary is wide, he has a detailed and accurate memory, good reasoning capacity and the ability to

reflect and to criticize his results. In the absurdity tests he showed a well-developed sense of humour, a useful trait if long treatment is to be embarked upon! There is no obvious reason on the intellectual side why he should evade the demands of school life.

The child's personality.—The answer must lie in the child's emotional life, and it is this aspect of the patient's personality that the psychiatrist is trained to investigate. With children he does it by various means; with the older child through talk, with the younger by methods of "play" (Rogerson, 1939; Lowenfeld, 1935; Gerard, *et al.*, 1938). A child, by the arrangement of toys in the sand-tray or his disposition of the family in the dolls' house, often reveals the family problem at home, and supplies a clue to his personal fears. The aggressive, assertive small boy is likely to choose guns and banging games. All children like to draw and paint; not only the theme of the drawing, but their method and style disclose temperamental traits as well as reactive superimposed attitudes to life (Eng, 1931; Fordham, 1944). The masterful, vigorous personality draws with thick, forceful lines and he goes at his task with decision and speed. The more gentle, passive nature shows a slower tempo and less splash of colour. The obsessional child, whose neurosis has made him over-solicitous and precise, may produce a composite of two styles, caution perhaps in his choice of subject and deliberation in execution, but with a repressed, potential aggression revealing itself in expressive and vigorous details of line and colour. One lively, imaginative, obsessional boy broke all the pencil points and almost pushed his lines through the paper, but could produce nothing more creative or individual than maps. In treatment, drawing and painting, and especially finger paints, have an expansive releasing effect as well as a specific value in revealing what the child thinks and feels. Talk investigates not only the child's immediate life but his past experiences, his fantasy and dream world, his longings and hopes, his fears and shames, his loves and hates.

To begin with, Leslie was shy and diffident. (A child's social attributes will often carry him through the psychological tests but fail him in an interview which he realizes is touching on his more intimate life.) He sat stiffly, there was tension in his posture and movements, he exhibited facial tics and wore a puzzled, anxious frown. He said he couldn't understand why he was so afraid of school; he had made many attempts to overcome his phobia but "the thought of it makes a turmoil in my mind, I can't think and I'm all in a whirl." He considers he is free of the fears which beset many children. "I haven't the 'ordinary' fears of bombs and animals, but I'm frightened of the dark and especially of silence. I like a companion, even a dog or a cat, in the dark, then I feel safe." The child breaks down and weeps discussing his father's illness, which he remembers vividly. He recalls being hurried off to school after his father had made an attempt at suicide by gassing; the upset and mystery, and the shame and anxiety for both his parents. Relatives attributed his father's breakdown to overwork and Leslie is in constant fear that he may overdo things again. This appears to be one clue to his school refusal, as he spends his days helping in the shop, takes the customers' money, and has only one ambition, which is to set up in business with his father as soon as he can leave school.

PHYSICAL EVALUATION

As part of the routine at the initial interview a physical examination is always made and the child-psychiatrist should be competent to detect any deviation from the normal in the patient's physical state. In cases of doubt a further opinion is sought from a pædiatrician whose services should always be available for consultation. But from the psychiatrist's point of view there are other reasons for an assessment of the patient's physique and state of health.

Physical health does condition *the mood and behaviour* of its possessor. It is necessary to distinguish between a psychologically conditioned emotional state

and one secondary to physical disease or disorder. The fatigue of the chronically ill child, perhaps from rheumatism or tuberculosis, is different in quality from that of a persistent anxiety state. The psychiatrist must differentiate between the restlessness of the choreic and the muscular overactivity of the child with tics. Apathy, dejection and lack of interest may be hypothyroid in origin or, alternatively, psychogenic, in the child carrying a load of unconscious guilt.

Then there is the group of *psychosomatic disorders*, the etiology of which is mixed (Gordon, 1939; Dunbar, 1943). Children suffering from the allergies, asthma and eczema are now being referred for a psychiatric opinion; gastro-intestinal disturbances, travel-sickness, migraine, and fainting attacks are recognized as in need of a double investigation and a two-fold treatment plan. Further research should throw additional light on the emotional factor in this group.

The psychiatrist also notes *the child's body build*, for physical constitution has an interesting correlation with mental make-up (Kretschmer, 1925). Children vary from the sturdy "pyknics," who seem more subject to behaviour disorders, to the long, slim leptosomes, who are more likely to show schizoid traits or to suffer from visceral psychosomatic symptoms or anxiety states.

After the physical examination, the psychiatrist sees the parent alone and supplements the social history by further inquiry from the more purely medical side. During the physical examination he has an opportunity of assessing the personality of the parents, and observing the impact of mother and child on each other.

CASE DISCUSSION

The team now holds a conference at which reports are presented. A discussion ensues, a diagnosis is made, and a plan of action is decided upon. To this conference are invited school medical officers, teachers, social workers, probation officers, or anyone conversant with the case.

DIAGNOSIS can be grouped under three headings:—

(1) If the problem is purely intellectual, a change of school or a residential school may be advised and the child referred back to the Local Authority. Psychotherapy is not called for, but remedial teaching may be undertaken by the psychologist for those backward in academic attainment through inadequate or erratic schooling or sensory deprivation.

(2) A large proportion of cases yield to simple environmental adjustment, and a few interviews devoted to parental enlightenment, and advice for specific symptoms may bring about a cure. Into this category come many of the children with developmental upsets, food-fads and fears, bowel and habit disorders, thumb-sucking and masturbation, particularly in the toddler years. Modification of the environment, to permit of greater activity and room to expand or opportunity for noisy play or quiet tasks, fulfils the needs of another group. Many children live in flats and cramped houses and are deprived of a child's birthright by present social conditions. Minor delinquencies in adventurous, boisterous children can be traced to the restrictions of a city life, and often disappear with regular attendance at a club or the Boy Scouts. The social worker puts the family in touch with outside organizations and it is she who is responsible for much of the educative work with the parents in a clinic.

(3) If the child is inherently so robust-minded that even a detrimental environ-

ment has made little impact upon his personality, the above measures may suffice, but a proportion of cases break down with a neurosis. A child, for example, with temper tantrums as a protest against a masterful, exacting father represses his anger through fear of punishment, and it reappears as a phobia—perhaps fear of dogs and the dark. His conflict is now internalized. There is here a double problem, a psychoneurotic child and a family setting which, sometimes unwittingly, reinforces his neurotic trends. It depends upon the severity of the neurosis and the constitutional mental make-up of the child whether psychotherapy takes the form of simple talks, suggestion, re-education and reinforcement of the personality, or whether a modified analytic method dealing with unconscious mechanisms is required. In this latter group, in which treatment is long, therapy is ideally a combined piece of work, the child with the psychiatrist and the parent with the social worker, who week by week enlightens, guides and re-educates the mother towards a better understanding of her child and his difficulties.

SELECTION OF CASES FOR TREATMENT

If time, effort and money are not to be wasted, a careful selection of cases suitable for psychotherapy must always be made. Physical and intellectual limitations in the child's potentialities have long been accepted; fundamental emotional or temperamental limitations are less easy to recognize, and their detection will probably always be largely intuitional. Experience, however, has made it clear that selectivity is even more essential in this field. Certain aberrations in emotional make-up (Henderson, 1939), shown by persistent instability of behaviour, lability of mood, distractibility and erraticism, respond better to environmental measures than to psychotherapy; in fact, deeper therapy often does more harm than good. Psychotherapy is best restricted to cases of inherently stable make-up with the potentialities of a reasonable degree of adjustment, an average or above average intelligence and some degree of insight—a quality of mind discernible even in the child of tender years. The psychiatrist who selects carefully will not overburden his treatment waiting-list with cases of poor prognosis, and as the average clinic providing full psychiatric time, two full-time psychiatric social workers, and one-and-a-half psychologists's time, expects to cater for a child population of 40,000 with a maximum case load of 400 to 500 cases a year, there is every reason why discrimination should be exercised.

TREATMENT

Leslie, then, is eminently suitable for intensive psychotherapy. Of what does his treatment consist?

The earlier psychiatric viewpoint was primarily concerned with the form and structure of neurosis or psychosis, with descriptions of outer demeanour, manner and behaviour. The more recent orientation favours the study of personality and sets out to explore the content of the mental life, and the meaning of the symptoms for the individual. Child psychiatry tends to a reconciliation of these two points of view. For the child himself disconcertingly refuses to fit into any textbook patterns of either diagnosis or nosology, and throughout treatment there is a constant intermingling of material from both the primitive and more conscious levels of his mind, which he continually illustrates by manner, gesture and facial expression.

Leslie's external self and his symptomatology have been described. What is going on

in the deeper recesses of his mind? In real life he is sedate and controlled, but his dream world is full of fighting and killing. On one historic occasion at school he did attack a teasing, bullying older companion and in a blaze of anger kicked him, and knocked him down the stairs. This brought home to him the strength of his passionate feelings which we recall his mother restrained at the age of three or four. Caution suggested an avoidance of boys' company to escape his more aggressive feelings. Leslie began to walk alone. Deeper anxieties are disclosed. He becomes aware of self-destructive wishes in himself, similar to those he knew his father had felt. "If I hurt someone badly I might want to kill myself as Dad did." This causes preoccupation with death and consequent separation from his parents and a further retreat from real life (Anthony, 1940). Play talk, paintings and drawings enable him to externalize his fears and realize his more aggressive self. He becomes noisier, livelier, and more boyish in behaviour. He loses his fear of silence. This fear of silence, like the adult's distaste for solitude, is fundamentally an avoidance of facing the feelings, thoughts and imagery forbidden by external authority and one's own repressive mechanism. Leslie's school refusal, then, is a symptom of a complex and deep-seated emotional disturbance, in part due to actual frightening experience, and in part to his reactions to such trauma. Not until the processes of investigation and integration are complete, can he return to school and allow his ambitions and imagination to soar out beyond the family circle with which up to now he has been too closely identified. It is interesting to speculate on the rival claims of the genetic and reactive etiologies of melancholia and depressive reactions, and to query whether treatment in childhood of a frustrated small boy might have prevented the psychotic breakdown of Leslie's father.

The background of Leslie's case is perhaps unusual, but his personality disturbance is not exceptional in clinic work.

Team work in a clinic (Sister Marie Hilda, 1944; Dickson, 1938) has a constructive value. It is economical of time and effort and saves duplication; each member brings his specialized knowledge to bear upon each case, and a more comprehensive and accurate diagnosis is assured, the child's physical, intellectual, constitutional and emotional qualities all being brought under scrutiny. Close collaboration between the psychiatrist and the psychiatric social worker hastens treatment and establishes the clinic as a prophylactic and educational centre. The clinic's numerous personal connexions, through the liaison work of each member of the staff, prevents a narrowness of outlook and keeps the clinic in constant contact with other branches of educational, social and medical services.

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NOTES AND QUERIES

THREADWORMS AS A CAUSE OF PRURITUS ANI IN ADULTS

QUESTION.—With reference to the note in your February 1945 issue, I should be grateful if you would inform me whether or not threadworms are a common cause of pruritus ani in adults. I have heard it said that in every adult with pruritus ani for which no obvious cause can be found, a careful search should be made for threadworms.

REPLY.—The possibility of threadworm infestation should be considered in every case of nocturnal pruritus ani, especially if the irritation comes on after the subject goes to bed, and dies away towards morning. If the pruritus is liable to be as severe during the day as at night, enterobiasis is unlikely. To show how easily these parasites may be overlooked, even by those best qualified to detect them, I would mention that I have been responsible for a diagnosis of enterobiasis (not previously suspected) in five medical men, martyrs to pruritus ani of a minimum duration of two years; one had suffered for six years, and one for over ten years. In each instance the suggestion of enterobiasis was received with some degree of incredulity and scorn. "*Quandoque bonus dormitat Homerus*"! All enjoyed a complete and permanent cure. In adults it is a waste of time to examine the fæces. I have watched the worms rioting inside the anal canal, yet fæcal matter passed a few minutes later contained neither worms nor discoverable eggs. The latter can readily be recovered from the skin around the anus. In my experience, it is more satisfactory and much more impressive to the patient—who will be called upon to submit to a severe regime to prevent auto-infestation—to demonstrate the worms by a rectal wash-out.

This can be carried out easily by the patient himself, using an infant's enema-bulb which is convenient and safe. Having made his preparations in some suitable place, he goes to bed until the irritation has reached its height. The enema is best administered in the lying position with the hips raised, and the syringe refilled two or three times in succession, using saline, two heaped teaspoonfuls of kitchen salt to the pint. The enema is retained for several minutes, the position being changed meanwhile by raising the legs and buttocks, say, against a wall, turning over on the face, and so forth. The saline is returned into a glass vessel for subsequent examination.

If threadworms are responsible, the pruritus will cease at once, and probably remain absent until the following night. If it returns when the patient warms up again in bed, enterobiasis is most unlikely, provided that the wash-out has been properly given. If the saline proves too strong for retention, reduce the strength to half. Should the patient be likely to prove undisciplined and refractory to the subsequent regime, normal saline may be used for the diagnostic wash-out. The worms will then be passed alive, and will be seen wriggling in the returned saline. This will give the patient a profitable shock.

Lt.-Gen. Sir W. P. MACARTHUR,
K.C.B., D.S.O., O.B.E., M.D., F.R.C.P.

INFECTIVE ENDOCARDITIS SUCCESSFULLY TREATED BY INJECTIONS OF YEAST

DR. J. WARREN DAVIS writes:—Many years ago I attended a patient at the Tower of London. He was the son of the Keeper of Regalia and lived in the flat over the traitors' gate. His symptoms were fever, chills and sweats, somewhat resembling malaria. He remained in this condition for a fortnight and the late Sir Douglas Powell suggested moving him to a nursing home. Sir Douglas could not detect anything wrong in any of his organs.

Soon after his admission to the nursing home he had several severe rigors and there were signs of emboli in lung and spleen. I then asked the late Sir William Broadbent to see him, and by that time there were distinctive signs of heart trouble. Various remedies were tried but the patient became rapidly worse and both consultants thought the condition hopeless.

I then suggested injections of yeast, as I had read that they had been used abroad in similar conditions. Messrs. Burroughs & Wellcome were interested and introduced me to a worker in their laboratory, who made the injection material, and sent each one up in a test tube by special messenger on the day for injection.

I do not remember how many injections I gave, but my patient soon began to improve. The fever, rigors and sweats gradually subsided and there were no more emboli. In fact, he made a complete recovery and entered the Army.

I thought this note might interest some of your readers, especially as penicillin is so much in demand and not always procurable. I am also wondering if by giving yeast by injection it may have properties in it that are probably destroyed when taken by the mouth. I am told yeast contains *Penicillium guacum;* so I must have been giving penicillin injections unknowingly about fifty or sixty years ago!

PRACTICAL NOTES

NICILLIN IN HUMAN ANTHRAX
EE cases of human anthrax, all occurring
ool workers, were successfully treated by
administration of penicillin, and the results
recorded by F. D. Murphy, A. C. La
etta and J. S. Lockwood (*Journal of the
rican Medical Association*, December 9,
, 126, 948). In two of the cases the peni-
1 was given initially by continuous intra-
us infusion and then by the intramuscular
e, in the third case, continuous intravenous
on only was employed. The response in
hree cases was rapid and definite. In the
case, after the patient had received approxi-
ly 25,000 units by intravenous infusion, the
ema and induration around the lesion had
st disappeared In this instance the course of
ment was a little over three days, a total of
coo units of penicillin being given: 175,000
itravenous infusion and 300,000 units intra-
cularly. In the second case the patient
loped a slight thrombophlebitis after
ooo units had been given by intravenous
ion, so that the intramuscular route was
ated to, the patient receiving 8,333 units
hourly for twenty-four hours The lesion
us case was on the face and when first seen
red a central black eschar, was discharging,
surrounded by small clusters of vesicles
re was also an enlarged and tender pre-
ular node. Twelve hours after the begin-
of therapy the discharge had disappeared,
esicles were dry and there was diminished
hema At the end of seventy-two hours'
ment all œdema and erythema had dis-
ared and the lesion was dry. In the third
, the whole of the total dose of 100,000 units
enicillin was given by intravenous infusion
mall dosage was deliberately used in this
ance, and culture and smear examined after
the total had been given This examina-
showed both to be still positive, and after
total dose had been given the smear remained
tive, although showing few organisms
nty-four hours after the treatment, how-
, both culture and smear were negative
the basis of the bacteriological and clinical
lings in these cases the authors state that the
1 minimum effective dose of penicillin is
,ooo units, at least 200,000 to 400,000 units
uld be given at the rate of 100,000 in twenty-
hours to the average adult in order to obtain
ropt and effective response It was noted
t in the first case, *B anthracis* could no longer
cultured or seen after 475 000 units had been
en, and in the second case negative smear

and culture were obtained after the administra-
tion of 150,000

CYSTICERCOSIS

DURING the last ten years there has been an
increasing interest in the rôle of cysticercosis
in the causation of fits. H. B. F. Dixon and
W. H. Hargreaves (*Quarterly Journal of Medi-
cine*, October 1944, 13, 107) have now published
their observations on 284 cases. A definite
history of infestation with tapeworm was
obtained from seventy-seven patients. Prac-
tically the entire series (274 patients) were
infected in India, and among the 269 soldiers
or ex-soldiers in the series, there was only one
officer Nervous manifestations varied from
typical Jacksonian seizures to transient mono-
plegias, paræsthesias, localized anæsthesia, visual
and auditory symptoms, aphasia, and amnesia.
Although only fourteen patients (5 per cent of
the series) showed signs of marked mental
deterioration, it is stressed that alterations in
personality and disorders of behaviour may
occur in cysticercosis without epileptiform
seizures. Diagnosis was most frequently first
established by radiology, alone (188 cases) or
combined with biopsy (24 cases), and it was
established by biopsy alone in fifty-five in-
stances. The cysts are usually about the size
of a small bean, and a history of transient
nodules under the skin was given by 165
patients In a suspected case a wide X-ray
examination of the whole body may be indi-
cated, starting with the lower limbs. In thirty-
two cases there was radiological evidence of
calcified cysts in the brain Should there be
neither palpable cysts nor radiological evidence
of calcified cysts in a suspected case, examina-
tions should be repeated at six-monthly inter-
vals, as there is sometimes considerable delay
in the cysts becoming manifest. As a result of
observations in fourteen patients, who were
submitted to cranial surgery, it is felt that the
only indication for such treatment is decom-
pression to save sight. Only 10 per cent of the
cases showed an eosinophilia, and it was found
that the findings in the cerebro-spinal fluid,
complement fixation test and skin reactions were
of little help The incubation period from the
time of infestation to the occurrence of
symptoms varied from a few months to twenty
years The prognosis is better than was at one
time considered to be the case the mortality
rate in this series was only 8 per cent , and only
8 per cent of those still alive were showing
any signs of deterioration

A MEDICATED, PLIABLE GELATIN FILM FOR THE TREATMENT OF BURNS

A DECREASED incidence of infection, and also a decrease in the time required for complete epitheliation, were noted with the use of a protein film (sulfagel), consisting of a pliable sheet of gelatin containing 2·5 per cent. sulphathiazole, 2·0 per cent. potassium iodide, and enough glycerin and water to render it soft and pliable, in the treatment of third degree burns produced in dogs (R. A. Roback and A. C. Ivy: *Surgery, Gynecology and Obstetrics*, November 1944, 78, 469). In addition to the third degree burns, excoriations and excisions were produced and treated with the gelatin film, the results being compared with those obtained by the use of a 2·5 per cent. sulphathiazole ointment (glyceryl monosteirate base), Pickrell's solution (sulphadiazine 3 per cent., methocel 3 per cent., triethanolamine 8 per cent., sorbital 4 per cent., sodium benzoate 0·1 per cent., water 81·9 per cent.), and, in burns, a 10 per cent. boracic acid ointment. The excoriations and excisions healed equally well with the gelatin film and the sulphathiazole ointment. Third degree burns (25·8 sq. cm.) healed somewhat more rapidly when treated with the gelatin film than when Pickrell's solution was employed, but healing time was the same with the use of the gelatin film and the 10 per cent. boracic acid ointment. Epitheliation was accelerated, however, when a firmly applied dressing was used. The medicated film should be melted and poured over the wound, and after it gels a sheet of the film is placed over the wound and a firm dressing applied. It was noted that the area of residual scar after complete epitheliation was larger when the medicated film was used (probably on account of the potassium iodide), but further study is necessary before it can be concluded that this is so and is advantageous. The observations did not indicate that the gelatin film was superior to a firmly applied boracic acid dressing, so far as the time required for epitheliation was concerned.

THE USE OF PNEUMOPERITONEUM IN THE PUERPERIUM OF TUBERCULOUS PATIENTS

THE results of the induction of pneumoperitoneum in the puerperium in thirty tuberculous patients treated during the last three years are reported by Phillis Dingle (*Journal of Obstetrics and Gynæcology of the British Empire*, December 1944, 51, 499). Antenatal supervision was under the control of the tuberculosis officer, and pneumothorax was induced when necessary. The aim of treatment in this period was adequate rest, food and fresh air, and, if necessary, patients were admitted to hospital for prolonged periods. The first stage of labour was made as comfortable as possible by the use of drugs, and the second stage was shortened as much as possible by means of episiotomy or the use of forceps. In most cases the infant was small and there was little delay in delivery. A pneumoperitoneum was induced within one hour of delivery: 3,000 c.cm. of air, or of an air and oxygen mixture, being injected slowly just above and to the left of the umbilicus. A week later a refill of 2,000 c.cm. was given, followed by one of 1,000 c.cm. at the end of another week. Occasionally more frequent refills were required. The aim was to maintain a pressure of 8-10 cm. of water for a month. During this period the mother was kept in bed and breast feeding was seldom allowed. All but two of the infants were discharged from hospital alive and well and have remained well. Only two of the mothers died: one suffered from bilateral active tuberculosis with positive sputum and her condition was considered hopeless from the beginning; the other proved uncooperative and died at home four months after delivery. Apart from these two patients, and one other who was in the last stage of the disease, none of the remainder showed any signs of retrogression as a result of pregnancy and labour. As a result of these observations the induction of pneumoperitoneum is advocated as a prophylactic measure in the treatment of tuberculous patients in the puerperium.

PRESSOR DRUGS

OF recent years a number of sympatho-mimetic drugs have been introduced into clinical practice. Their main rôle is in the treatment of low blood pressure in such conditions as spinal anæsthesia, surgical shock or peripheral circulatory failure. F. Prescott (*British Heart Journal*, October 1944, 6, 214) has compared the value of four of these drugs in patients who experienced a severe fall of blood pressure while undergoing major operations, most of which were carried out under spinal anæsthesia, or local anæsthesia reinforced by inhalation anæsthesia or pentothal. The drugs investigated were methedrine, neo-synephrine, paredrine, and pholedrine (veritol). The criteria of the ideal pressor drug were taken to be:—(1) It should be effective by the intramuscular or intravenous route; (2) it should act rapidly; (3) it should produce a sustained rise of blood pressure; (4) it should have no undesirable effects upon

se cardiovascular system; (5) it should have no untoward side-effects. A result was considered to be satisfactory if the systolic pressure remained above 100 mm. Hg and the pulse pressure was not less than 30 mm. Hg for a period of at least two hours. Satisfactory results were obtained with methedrine in eighteen cases, with paredrine in eight, with neonephrine in seven, with pholedrine in four. Each drug was given to a group of twenty patients. Side-effects were all transient and only lasted for a few hours; they consisted of disturbances of rhythm and the production of systolic murmurs. The results with methedrine may be summarized as follows: repeated injections were only required in two patients; the average final rise in systolic pressure was 3 mm. Hg; the average final rise in pulse pressure was 34 mm. Hg; it usually quickened the heart rate, but occasionally it caused slowing; it began to act in three to four minutes and produced the maximum rise in blood pressure in seventeen minutes; in the eighteen patients in whom its action was considered to be satisfactory, its action persisted for more than two hours.

THIOCYANATES IN THE TREATMENT OF HYPERTENSION

IN recent years renewed interest has been shown in the hypotensive effects of the thiocyanates. One of the latest reports is that of L. Koffler, A. W. Freireich and I. J. Silverman (*American Heart Journal*, October 1944, 28, 411) who, over a three-year period, have investigated the effect of potassium thiocyanate in 39 outpatients with essential hypertension. After a control period to obtain as reliable a figure as possible for the blood pressure, potassium thiocyanate was given by mouth (in an aqueous solution containing 0.1 gm. of the drug per 10 minims) in doses of 0.1 gm. thrice daily. At the end of a week of this treatment the blood thiocyanate level was estimated, and dosage adjusted according to this level. Weekly estimations of the blood thiocyanate were maintained until a constant level was found. Clinical investigation showed that the blood thiocyanate remained at a constant level throughout the day when the drug was being given three or four times daily, but there was no correlation between the urinary excretion of the drug and the daily intake or the blood concentration. Approximately half the patients in this series showed an appreciable lowering of the blood pressure, and in a few others subjective improvement was claimed. The mode of action of the thiocyanates in hypertension is still not quite clear, but it has been claimed that they are normally present in the body in greater concentration than any other depressor substance. The main point emphasized in this article is that, in order to avoid toxic reactions, regular estimations of the blood thiocyanate level must be made. This is particularly important in view of the fact that there is considerable variation in the response of the blood thiocyanate level; even such doses as 0.1 gm. thrice daily may produce dangerously high levels in the blood.

THE TUBERCULIN PATCH TEST

CONFIRMATORY evidence of the reliability of the tuberculin patch test is provided by Margaret D. Giles (*Glasgow Medical Journal*, December 1944, 142, 189) as a result of an investigation carried out on 506 children between the ages of three months and thirteen years. Three methods of tuberculin testing were used:—(1) the Mantoux intradermal test, using 0.1 c.cm. of a 1 : 5000 solution of old tuberculin, or, if no reaction was obtained with this strength, a 1 : 1000 solution; (2) the Pirquet scratch test; (3) the patch test. In the majority of cases (456) the patch was made from a strip of adhesive tape, 1 in. by 2 in., on which were placed three squares of filter paper (1 cm. by 1 cm.) about half-an-inch apart. One square was saturated with undiluted old tuberculin (human), another with old tuberculin (bovine), and the third served as a control. The patches, covered by a strip of stiffened gauze, were stored in a clean glass jar. The patch was applied between the scapulæ and left *in situ* for forty-eight hours. The test was read when the patch was removed, and again forty-eight hours later. In 89 cases the patch test performed with tuberculin jelly was compared with the ordinary patch test. In every instance the results with the Mantoux and Pirquet tests were identical, and in 483 cases (i.e. 95.45 per cent.) the patch test agreed with them. Of the remaining twenty-three cases: fifteen gave a negative patch reaction and a positive Mantoux reaction, although in three instances the Mantoux reaction with 1 : 5000 O.T. was negative and it was only with the 1 : 1000 O.T. that a positive reaction was obtained; six gave a positive patch reaction with a negative Mantoux reaction, whilst two gave a positive patch reaction and a positive Mantoux reaction with 1 : 1000 O.T. but a negative Mantoux reaction with 1 : 5000 O.T. The tuberculin jelly patch gave results in complete agreement with the ordinary patch test. In view of these findings, and the ease with which the patch can be applied, it is recommended that the tuberculin patch test should be used as a routine in children.

REVIEWS OF BOOKS

The Anatomy of Courage. By LORD MORAN. London: Constable & Co. Ltd., 1945. Pp. xiv and 216. Price 8s. 6d.

A BATTALION medical officer in the war of 1914–18, Lord Moran has drawn freely on his diary of those times, adding to it his later experiences of men and affairs and what he has learnt in this present war, especially from pilots of the Air Force. He describes first the discovery of fear, then how courage is spent and, finally, the care and management of fear. The easy style of the book conceals what must have been a difficult task of pruning and it is pleasant to complain that in some respects the author has disciplined his brevity too much. The modern reader realizes at once how fortunate the battalion of the Royal Fusiliers was in its medical officer, and that the same medical officer should in the present war have even greater responsibilities seems only fitting. A diary of Lord Moran's travels in the past five years, annotated in his highly individual style of philosophy, may provide a successor to the present volume.

Studies of Burns and Scalds. Medical Research Council Special Report Series, No. 249. London: H.M. Stationery Office, 1944. Pp. 210. Figures 50. Price 4s.

THIS is an important and fully documented collection of papers from the Burns Unit at the Royal Infirmary, Glasgow, on certain aspects of the burns problem. Chief stress in the local treatment of burns is laid on the prevention of infection. For emergency treatment, covering with a sterile or recently laundered towel and immediate evacuation to hospital is recommended. When delay is likely to take place before definitive treatment can be given, a cream containing sulphanilamide and "cetavlon" is advocated. The standard application during hospital treatment has been a mixed sulphanilamide and sulphathiazole cream, but the sterilizing effect of a similar penicillin cream is so superior that it is a fair inference that it will ultimately replace the sulphonamide cream. Detailed studies are given on replacement therapy for the shock of burns, and the importance of hæmoglobin investigations to control the amount to be given is stressed. The significance of the development of anæmia, particularly in the late stages of severe burns, is stressed. In the chemical investigations, it is shown that in the severely burnt patient the low levels of plasma protein may constitute a problem in healing which may require protein digests, intravenously or by intestinal intubation. These brief excerpts give only some of the main conclusions of the authors, and this is a book which all who are interested in the problem of burns will want to read and study at leisure. For practitioners it would have been an advantage if a summary of the main practical applications of the studies had been given separately.

Physical Medicine in General Practice. By WILLIAM BIERMAN, M.D. New York: Paul B. Hoeber, Inc.; London: Hamish Hamilton Medical Books, 1944. Pp. xi and 654. Illustrations 310. Price 37s.

PHYSICAL medicine still tends to be the Cinderella of therapeutics, a state of affairs for which both physiotherapists and general physicians must jointly accept responsibility. For the treatment of orthopædic conditions and most forms of rheumatism its importance is well recognized and full use is made of it, but in many other conditions, in which it is undoubtedly helpful, full use is not yet made of its therapeutic potentialities. This latest addition to the growing literature on the subject should help to make clearer to the general practitioner the extent to which physical therapy is of help to him. Written by an expert on the subject, it is essentially practical in its outlook. Sufficient theory is introduced to allow the general medical reader to understand the many methods employed, but the greater part of each chapter is devoted to the practical application of the different forms of physical therapy. All the varying forms of physical medicine are dealt with. Chapters are included on fever therapy and occupational therapy. The book concludes with a series of sections summarizing the uses of physiotherapy in diseases of the different systems of the body. Written in a clear, straightforward style and copiously illustrated, the book should prove of value, not only to the general practitioner, but also to those who are proposing to adopt this speciality. As is perhaps inevitable, the sense of balance is not very well maintained and the novice must realize that in the treatment of many conditions physiotherapy is but a part, and often a small part, of the treatment that must be given. Fortunately, the author has been able to temper his enthusiasm for his speciality and has thus avoided the impression that physiotherapy can work miracles. What is now awaited is an equally lucid exposition of the physiological principles upon which physical medicine is based.

ntal Abnormality and Crime. Edited by L. RADZINOWICZ, M.A., LL.D., and J. W. C. TURNER, M.C., M.A., LL.B. With a preface by Professor P. H. WINFIELD, K.C., LL.D., F.B.A., J.P. London: Macmillan & Co. Ltd., 1944. Pp. xxiv and 316. Price 18s. is is the second of a series of studies in inal science sponsored by the Faculty of w at Cambridge. As the editors point out, investigation of mental abnormality in crime ' into a vast and complicated field, to which ; book is intended only as an introduction. such it will be found useful, although it does , except in one or two of the contributions, justice to the large volume of theoretical and ical studies published in Germany, Sweden, ly, and other European countries. American tings receive much fuller consideration, and iter volume in the series, by Professor and s. Sheldon Glueck of the Harvard Law ool, is to deal with the after-conduct of dis- urged offenders in the United States. There thirteen essays in the present volume, dealing turn with the relevance to criminal behaviour psychoses, psychoneuroses, mental deficiency, chopathic constitution, physical disease and itus, and alcoholism. These chapters are m the pens of A. MacNiven, R. D. Gillespie, O. Lewis, D. K. Henderson, Norwood East, l G. M. Scott. Norwood East also con- utes a valuable chapter on sexual offenders, l D. R. MacCalman discusses functional vous disorders after injury. The physical and ntal features of the juvenile delinquent are It with by J. D. W. Pearce, the social and nlial aspects (including the problem of birth er) by Emanuel Miller. A report on the work the Institute for the Scientific Treatment of linquency, by Edward Glover, and one on the eter Child Guidance Clinic, by R. N. Craig, clude the volume, which also contains an roductory chapter by J. R. Rees on mental tiations, and a chapter on crime in the Army, G. de M. Rudolf.

ads for Britain. By J. F. BRAMLEY. Birmingham: Austin Motor Co. Ltd., 1944. Pp. 48. Illustrations 37. Price 5s. EDICAL practitioners probably make as much e of the roads of the country as any other ction of the community. They will therefore d much of interest in this little book, which rovides an excellent survey of the various plans at have been put forward of recent years for e planning of the roads of the country. An troductory chapter, dealing with the historical pects of the roads of Great Britain, is followed y chapters summarizing, among others, the ressey Plan for London and Greater London, the County of London Plan, the Royal Academy

Plan, the City of London Plan, the County Surveyors' Scheme, and the Alness Report. There is also a useful summary of the Ministry of War Transport "Memorandum on the Lay- out and Construction of Roads." All these are discussed in their relationship to road construc- tion and road planning, and the author is careful to avoid any personal bias in his presentation of the subject. Road planning is so intricately involved with town and country planning that it requires an expert to disentangle the relevant information from all the numerous reports that have appeared of recent years. It says much for the skill with which the book is written that the author, out of the welter of data, has been able to produce an account of the problem that is as instructive as it is interesting. All users of the roads, whether motorists, cyclists, or pedes- trians, will derive much information, as well as pleasure, from a perusal of this book.

NEW EDITIONS

IN view of the necessity for economy imposed by war-time restrictions the authors of *Handbook of Practical Bacteriology*, by T. J. MACKIE, C.B.E., M.D., D.P.H., and J. E. McCARTNEY, M.D., D.SC., in its seventh edition (E. & S. Livingstone Ltd., 17s. 6d.) have wisely, and with good effect, made use of the appendix, which was added to the previous edition, for the incorporation of advances during the past three years, among which are a section on the estimation of the bacteriostatic action of penicillin in the blood, a description of fluorescence microscopy, the action of antiseptics (and particularly the sulph- onamides) in relation to bacterial nutrition, the Kahn test for syphilis, and a number of other important subjects, all of which are connected with the main text by chapter headings and references. There is also a new section on the bacteriological examination of infected wounds.

ALTHOUGH only two years have elapsed since the previous edition of *Handbook of Physiology and Biochemistry*, by R. J. S. McDOWALL, M.D., D.SC., F.R.C.P.ED., considerable revision has been undertaken in the preparation of the thirty- eighth edition (John Murray, 25s.). No less than eighty new illustrations have been included, and the value of this well-known textbook has been enhanced by the addition of a bibliography.

A CHAPTER on the sex hormones and sections on vitamin K and the Rhesus blood factor are among the new material added to the eighth edition of *A Synopsis of Medicine*, by SIR HENRY LETHEBY TIDY, K.B.E., M.D., B.CH., F.R.C.P. (John Wright & Sons Ltd., 30s.). The many important advances in medicine that have developed since the appearance of the previous edition in 1939 have entailed considerable rewriting in the preparation of the new edition, which has been brought up to date in all sections.

NOTES AND PREPARATIONS

NEW PREPARATION

AMMONIUM CHLORIDE TABLETS M & B—These specially coated tablets have been prepared for oral administration, chiefly in conjunction with injections of mercurial diuretics, for increasing the diuretic action by acidification of the urine. The tablets (0·5 gm.) are issued in containers of 25 and 100, by Pharmaceutical Specialities (May & Baker) Ltd., Dagenham, Essex, from whom further particulars can be obtained.

ANTI-VENEREAL DISEASES CAMPAIGN

THE Ministry of Health has issued a notice to all Local Authorities and Port Health Authorities (Circular 42/45) dealing with new publicity material for local use in support of the educational campaign on venereal disease. A folder is issued in conjunction with the notice, giving particulars of the material available, which includes posters, sound films and literature. A limited number of mobile cinema units are available through the agency of the Central Council of Health Education, and the services of the Council are at the disposal of subscribing Local Authorities for the free organization of lectures, and the provision of lecturers at a stated fee. Further particulars can be obtained from the local Medical Officer of Health, or from the Medical Adviser and Secretary, the Central Council for Health Education, Tavistock House, Tavistock Square, London, W.C.1.

VITAMIN DOSAGE

COPIES of the article by Dr. Cecile Asher on this subject, which appeared in the March issue, are available, price 6d. each, post free, on application to *The Practitioner*, 5 Bentinck Street, London, W.1.

REFRESHER COURSE ON TUBERCULOSIS

A REFRESHER course on tuberculosis, for tuberculosis officers and medical practitioners, will be held in Manchester, at the Medical Theatre, the University, Oxford Road, from Monday, April 23 to Thursday, April 26, 1945. In addition to lectures on the different problems of tuberculosis, visits to the Barrowmore Hall Tuberculosis Colony and the Baguley Sanatorium have been arranged. The fee for the course, which is approved by the Ministry of Health and the Department of Health for Scotland, is four guineas. As the number attending is limited to fifty, applications should be made without delay to Dr. Harley Williams,

Tavistock House North, Tavistock Square, London, W.C.1.

PROVISIONAL NATIONAL COUNCIL FOR MENTAL HEALTH

THE first Report of the Council, which deals with the work carried out during the period April 1, 1943 to March 31, 1944, has just been issued, and contains a wealth of interesting information. The activities of the Council are widespread, embracing the education of parents and children in matters of mental hygiene, the training of students, health visitors, social workers and probation officers, the establishment of child guidance clinics, and last, but not least, the social work department, which deals with after-care, foster and emergency homes, guardianship, residential schools, and the employment of epileptics and psychiatric casualties. A copy of the Report can be obtained from the Secretary, the Provisional National Council for Mental Health, 39 Queen Anne Street, London, W.1.

THE CARE OF THE FEET

THE Foot Health Educational Bureau has recently published a booklet entitled *Take Care of Your Feet*, in which the important subject of choice of correct shoes, both for the child and adult, is discussed at some length. There is also a useful chapter on exercises for the prevention of foot troubles and for maintaining correct function of the muscles. Copies, price 5s., can be obtained from the Foot Health Educational Bureau, 7 Park Lane, London, W.1.

THE GENERAL PRACTITIONER'S PART IN PREVENTION OF VENEREAL DISEASE

By SIR DRUMMOND SHIELS, *M.C.*, M.B.

Adviser on Social Hygiene, Central Council for Health Education: Medical Adviser, British Social Hygiene Council.

T should be possible to make venereal disease a rare occurrence. ·The medical ofession is well informed about its causes and method of transmission, and odern methods of treatment, if applied in time, are effective. (It is necessary emphasize treatment in connexion with prevention, as prompt and effective eatment is the most certain method of prevention.) There is no one way or plan hich will bring about such a desirable state of things. Not only national measures every country, but also international action, such as that pioneered by the onvention for Seamen, is required.

BETWEEN THE WARS

this country great efforts were made after the last war, and these were not ithout success. Progress was slow but steady, and at the beginning of this war ses of syphilis were down by two-thirds from what they were at the peak period st after the last war, and gonorrhœa by a less certain but substantial amount. is necessary to start all over again, and this time—as in the larger international here—an effort must be made to make a more thorough job than last time.

For various reasons, general practitioners, during this same period, have not ken a leading part in the national effort to cope with venereal disease. There was stigma associated with it which, although less than it used to be, still persisted; e popular prejudice was shared by a good many practitioners, who did not elcome this type of case; treatment for syphilis had become specialized; the local eatment for gonorrhœa was protracted, and troublesome to carry out in a onsulting-room used for other patients; not all medical schools provided adequate raining; and to get a name for doing much of this work was not always good for eneral practice.

Venereal disease therefore became largely the concern of the free and confidential linics set up after the last war, the medical staffs of which, in a number of cases, lso did private work. These clinics, on the whole, did their job well, and many f them have established a high reputation and have given splendid service. In ecent years, steps have been taken to coordinate the efforts of some of these clinics as of other public health services) with the work of local general practitioners, process which must be extended if a comprehensive attack on these diseases is

to be achieved. It is doubtful if the actual staffing of VD clinics by part-t
general practitioners is the best way of utilizing the services of the family pr:
tioner in this work. There is much to be said for the medical staffs of munic
or county clinics being full-time workers, acting as the expert advisers on anti-
operations in the town or district, and being the centre and·inspiratior
coordinated effort. In the working-out of this coordination, there should
included, not only general practitioners, but also the different social and wel
agencies which have come to be recognized as essential to comprehensive treatn
of what is always more than a purely medical problem. The VD almoner, or o
skilled social worker, has become almost indispensable in clinic work. The mec
problem is, however, fundamental and immediate, and it is certain that ger
practitioners will take a more active part in its solution in the future than
have done hitherto.

WAR CHANGES

The war has produced a number of changes in the VD situation which have s
interest and relevance for the general practitioner. There has been a large incr
in the number of cases, as always happens in time of war. The Government
the Ministry of Health have naturally been concerned about this, and, am
other steps taken, have carried through—in conjunction with the Central Cou
for Health Education—an extensive newspaper campaign which has given v
publicity to the main facts about these diseases, and has tried to express an
inculcate a'sane and healthy attitude towards them. These newspaper campai
have been supplemented by numerous platform talks, arranged regionally by
Central Council for Health Education, for which special films have been excelle:
produced by the Ministry of Information. The radio, shut off before the
from any reference to VD, has provided not only information, but also discussi
on this hitherto tabooed subject. Although, as has been said, prejudice still rema
there seems good reason to believe that this newspaper and other publicity :
discussion have removed many of the morbid fears which the secrecy and myst
of former days engendered, and which often led to failure to seek treatm
Many general practitioners—actual and potential—have been treating VD in
Forces, where the general practice of hospitalization during the infective per
has done a great deal to safeguard the civilian population. The treatment
gonorrhœa has become much more convenient. In many rural areas, in accordar
with a war-time Ministry circular, general practitioners have been undertak
VD work for local authorities, supplementing the existing services. For all th
reasons, it seems likely that many more general practitioners will be offered a
will accept VD cases, which will help towards the abandonment of the segregati
so long associated with such patients, and which had bad physical and psychologi
results.

GENERAL PRACTIONERS AND VD

Many practitioners consider that treatment of VD is difficult and troublesom
and have as a matter of course referred such cases to the clinics. There has be
a good deal of justification for this attitude, especially in districts where access

well-staffed and well-equipped clinic was possible. In many areas throughout England, Wales and Scotland, however, these facilities are not available, and many patients in the past have suffered because general practitioners have been unable, or unwilling, to undertake their treatment.

High authority has expressed the view that treatment of syphilis by general practitioners does not present any insuperable technical obstacles. Other articles in this issue will expand and justify this statement. Routine, or even intensive anti——the latter comprising two or three arsenical injections a week—is possible. And the treatment of gonorrhœa by the sulphonamide group of drugs, taken orally, is well within the scope of the ordinary practitioner.

Penicillin treatment for both gonorrhœa and syphilis, which may involve intra-muscular injections at three-hourly intervals, would be difficult in private practice, on account both of the time and of the nursing factor. If, as some recent work suggests, there may be in the near future some method of giving penicillin so that single intramuscular injection will maintain an effective blood concentration for twelve or more hours, the position will be different.

COOPERATION

Especially in the beginning, a general practitioner might need and would get useful help from the medical staff of any clinic available to him. He would receive assistance and advice on the treatment of his patients, and could have special tests, e.g., urethroscopy or lumbar punctures, carried out, as well as tests of cure. Difficulties met with could often be solved by discussion with the clinic medical officer. Friendly personal relations are of great value, and there would be few instances in which the approach by the practitioner would not evoke a willing and cheerful response. If a clinic in his district were not available, a short course in city clinic might be arranged for the general practitioner through the Ministry of Health, so that he would be able to take up this new type of work on his own, with knowledge and confidence.

Dosage of sulphonamides is a difficult matter, and there has been a good deal of ventilation of the danger of inadequate dosage creating resistant strains of organisms. One enterprising medical officer of health, after consultation with his VD officer, issued a guide to dosage, which was much appreciated by the general practitioners in his area. There is a feeling, however, among many of those concerned, that the setting-out of minimum standards of investigation, treatment, and surveillance after treatment should be a matter for the Ministry of Health.

The ultimate test of cure of gonorrhœa is biological, and, in view of the small number of relapse complications that specialists find in patients treated by general practitioners—e.g., rheumatism, salpingitis, epididymitis—it must be accepted that the ultimate cure rate is high. On the other hand, it will be agreed that it is absolutely necessary to have the highest possible clinical and bacteriological standards of cure prior to the biological test. Here, as has been said, the clinics could and would help.

LABORATORY SERVICES

During the war, the Emergency Public Health Laboratory Service has made all laboratory facilities, including advice from pathologists and other skilled personnel,

readily available to general practitioners. Among other results, this has increase the status of general practitioners, and has enabled them to proceed with many of their cases, instead of having, as before, to send them to hospital in order to have tests carried out.

Post-war medicine will involve a wider range of differential diagnosis than heretofore. Men who have served in Burma and in other Eastern countries may develop unfamiliar conditions, and the value of these laboratory and pathological faciliti will be great. In connexion with VD itself, statistics show that many person examined under suspicion of having VD are found to be free from that diseas but, in some cases, to be suffering from something else. Even if a general pract tioner makes a practice of sending his VD cases to the specialist, it will give mo satisfaction to himself, and add to his professional reputation, if he is able to assu himself accurately of the diagnosis before transferring patients for treatment.

Although the facilities which have been made available to general practition during the war have been labelled "emergency," they have almost certainly con to stay. They have proved such an asset to the medical profession, and to the community, that general practitioners cannot be asked to go back to a system which largely confined their contacts with laboratory services to diphtheria swabs and examinations of sputum. In relation to VD, however, it does not seem to be sufficiently known that free laboratory facilities for examination of VD specimen have existed since 1916—smears for gonococci, serum for *T. pallida*, and Wasse mann tests.

It is obvious from the Government's proposals for a National Health Servic that priority is to be given to the provision of adequate hospital services. Con currently with this, however, the Ministry of Health and Municipal Authoriti must appreciate the fact that in all health matters the first approach is, normally to the family practitioner, and that he must have the facilities hitherto largel denied to him, but made available during the war, so that the liaison between th general practitioner and the hospital service may be harmonious and effectiv Whatever the upshot of the controversial matters now being discussed betwee the medical profession and the Government, the public health and preventiv services must be better linked up with the curative services. These services ar complementary and, whatever may be worked out as the general medical scheme fo the country, there must be fuller and freer cooperation between hospital and general practitioner, so that he may make his full contribution to public, as wel as to personal, health. It is to be hoped that VD will not be left outside the scop of this desirable and harmonious working.

CONTACTS AND DEFAULTERS

The general practitioner will assist in preventing the spread of VD if he himself, remembers the public health aspects of the subject, and does not simply treat individual cases as they present themselves. It is not so much that adequate time must be given to clinical examination, the formation of diagnosis by the appropriate pathological tests, and the guarantee of adequate tests of cure, although all of these are important, as that every attempt must be made to bring under treatment the contacts of VD patients. If a husband is being treated, every

rt should be made to have the wife examined also. This sometimes creates a
icate situation, and there may be a tendency to shirk the issue, and to confine
estigation and treatment to the patient. This may, indeed, be asked for by the
band. It has been found, however, that a tactful but straightforward explanation
he necessity for investigation can be successfully made, without, in most cases,
ung serious domestic disturbance. It is most important that the wife's condi-
should not be left uninvestigated or untreated.

n one recent case, a man had been under treatment by a general practitioner for some
e for secondary syphilis. No attempt was made to bring the wife under examination
, later, when she attended an antenatal clinic, she was found to be suffering from florid
ondary syphilis.

To attempt to get treatment for every possible contact is not only humane,
it is also a big contribution to reducing the incidence of VD. It should be
phasized to the patient that contact-tracing is a health measure—not punitive—
so many assume.

Medical officers of health are struggling, with the help of Regulation 33B and
ifidential contact-tracing, to do the same kind of thing, to locate contacts and
get them under treatment. The intimations of general practitioners who have
the special qualifications indicated in the relevant circular cannot be officially
lized, but general practitioners working sympathetically with medical officers
health can do a great deal to see that contacts are not left—often in ignorance—
become a danger to themselves and to others.

The *prevention of default* in treatment is another great factor in VD prevention,
d presents problems, the solution of which has been attempted from many angles.
ie general practitioner has an advantage here, compared with the clinic, as there is
reason for avoiding the consulting-room because of fear of the cause of the visit
ing known. VD specialists and teachers have always emphasized the tremendous
lue of a short talk with the patient at the first consultation, a talk which should
t be alarmist but which should so emphasize the serious consequences of neglect
treatment as to make a deep impression. The VD patient is sensitive and much
preciates being treated in an informal and human way. It has been found that
e clinics throughout the country with the smallest defaulter rate are those where
e atmosphere is most friendly and where there is no suggestion of a condemnatory
titude. The general practitioner has the creation of such a reception and response
his own hands.

MARRIAGE AND PREGNANCY

nother direction in which the general practitioner can be most helpful is in
nnexion with marriage and pregnancy. There is an increasing willingness among
ung people who are getting married to submit themselves to tests of health and
f fitness for parenthood, and this should be encouraged. A blood test can be made
s part of the routine overhaul, the purpose of which need not be particularly
idicated. What is even more important is a serological test early in pregnancy.
he birth of congenital syphilitic children is something which should simply never
e permitted to happen, and this is a sphere in which the general practitioner has
till a wide field. Not in all antenatal clinics are routine tests for syphilis applied,

and there are many who feel that it is worth while to use, both in clinics and private work, every possible precaution against one of the most tragic happening in midwifery.

Pregnancy may have little effect on the course of acquired syphilis but in m cases there is a tendency to suppression of the disease. The primary sore invol rapidly and the secondary symptoms may be entirely absent. In such cases, routine application of serological tests is the only method of detecting mater infection.

Some concern has been expressed as to the possibility of "false positive" res being obtained in the serological tests; the specificity and sensitivity of w conducted serological tests, e.g., the Kahn verification test or the Harris Richardson modification of the Wassermann reaction, reduce to a minimum possibility of erroneous diagnosis of syphilis.

PROPHYLAXIS

The prophylaxis of VD has been for long a vexed question. Service authorit in America and this country act on the principle that it can be achieved, in so degree at least. It has been opposed on moral grounds, as it is contended that availability of safe prophylaxis would increase promiscuity. From the pur public health point of view the Services' attitude is justified, but conditions civilian life are less favourable. No method of prophylaxis—chemical, mechanic or a combination of both—is 100 per cent. effective, and protection against syph involves a meticulous procedure. Medical practitioners will be questioned abc this subject and the clinic officer's advice would be helpful.

THE PRACTITIONER AS TEACHER

It would seem, under present conditions, ironical to suggest that the over-work general practitioner should do anything in the way of giving public addresse If, and when, possible, however (perhaps in assisting the medical officer of heal in his propaganda meetings), the general practitioner would be surprised and pleas to find how much his opinion is respected and the stress that is put on his advic Perhaps, in post-war days, this development may be more feasible. It is a develop ment which would be a great public service, and need not be one without remuner tion. Health subjects—thanks, in some degree, at least, to the "Radio Doctor"- are now becoming more popular, and it is quite possible to get good audience even for talks on general health. What is, however, highly relevant to the subje under consideration is the enormous demand at present, and one which is certai to be greater in the future, for reliable information on matters of sex. Genera practitioners could do this job well, and they would find a big response from clergy men, teachers, youth and club leaders, and social and welfare workers, who ar concerned about the position and attitude of many adolescents to-day.

This is the real long-range attack on venereal disease. VD is only a symptom, and it cannot be adequately dealt with apart from the physiological and social conditions which make it possible. Not only so, but ignorance or wrong information about sex matters, extremely common among adolescents, in spite of all their precocity, often

rings fears and anxieties, affects physical and mental health, and is the cause of good deal of neurosis.

Lectures of this kind are an important present activity of the Central Council r Health Education, and, when these are given by a medical man—or woman— terested in the subject and keen on the welfare of young people, they achieve a sponse from adolescents beyond anything which the most competent layman can hieve. Meetings, also, of parents, anxious about the way to approach the subject ith their children, can be of great value, and are eagerly attended by fathers and others who find modern conditions in this physiological and emotional field yond their personal resources, and who are yet keen to carry out their full sponsibilities.

In the meantime, the general practitioner can talk to his own VD patients, id a little time spent on this at the beginning is most valuable, and may make all e difference in regular attendance, and thus in early cure. A supply of a small ooklet issued by the Central Council for Health Education, giving the main ints about the diseases, can be obtained, and it will save time in description to ve a copy to patients, although this does not dispense with the need for a few m and kindly words to ensure cooperation. I have seen quite intelligent patients ho had been under treatment for some weeks, and who were not aware whether e VD they had was syphilis or gonorrhœa, as nothing had ever been said to them 1 the subject. These were not patients of general practitioners.

A SUMMING-UP

'hat the general practitioner may be asked to do in the prevention of venereal isease may be summed up as follows:—

(1) He should not exclude it from his consideration, but bring it into line with her conditions with which he has to deal.

(2) He should take full advantage of all facilities available to him to establish iagnosis and—especially where clinics are few or absent—should not be afraid) tackle treatment, remembering that the clinic medical officer and the pathological pecialist, however remote, can always be made available.

(3) He might cooperate in the important preventive tasks of securing contacts or examination and of diminishing default in attendance for treatment.

(4) He could carry through tests of fitness for parenthood for young people etting married; he could do a great service in seeing that early treatment is applied hen there is any possibility of the birth of a congenitally syphilitic child.

(5) In addition to talking to his own VD patients—especially if, under any new ealth system, he has the leisure of which he has so little at present—he could play most useful part in the long-range attack on VD, by helping to ensure that dolescents are adequately equipped to cope with the problems of sex with which ach of them, sooner or later, will be confronted, and this amidst a sex stimulation rom many directions greater than that experienced by any former younger eneration.

VD can, and should, be eradicated. This can be done only by the close coopera- tion of the appropriate medical, social and educational agencies; amongst these, general practitioners can play an important and honourable part.

PROBLEMS OF VENEREAL DISEASE IN THE ARMY

By Brigadier T. E. OSMOND, M.B.

Consulting Venereologist to the British Army.

VENEREAL diseases have always presented serious problems in armies, mor particularly in war time, and they are likely to continue to do so in the future although the expression "brutal and licentious soldiery" is far less applicable t modern citizen armies than to the mercenary ones of former times. It will ! convenient first to state the *position* and then to consider *prevention* in its differe aspects. The following remarks apply almost exclusively to male soldiers, sinc the incidence of venereal diseases in the Auxiliary Territorial Service is very lo and therefore does not constitute a serious problem.

THE POSITION

This, in the Army, differs from that in civilian life in numerous ways:—

(1) Service men and women mostly belong to the venereal disease-prone age groups, or perhaps it would be better to say to those age-groups in which promis cuous sexual intercourse is most frequently practised.

(2) Soldiers are mostly separated from their families—wives, mothers an sisters—and home life is at a discount. Married men miss the physical side c marriage and the unmarried ones often of necessity seek their evening pleasure in public houses or dance halls rather than in the bosom of their families or a their hobbies.

(3) Communal life leads to pornographic talk and the weaker ones are ofter led astray by their more adventurous comrades.

(4) Social life spent in public places undoubtedly leads to the consumption o alcohol. This drug removes inhibitions and leads many a man to take a chance which he would not take in his stone-cold, sober moments; the wines and other alcoholic liquors of many countries are unexpectedly potent.

(5) In many places overseas all the above factors operate in a greater degree than at home; brothels abound, clandestine prostitutes parade the streets and frequent places of amusement, pimps importune anyone in Service dress, and fornication is the fashion.

(6) The even tenor of civilian life is wholly absent in the Army in war. The soldier is frequently bored, uncomfortable and overfit, with little outlet for his pent-up energies or, on the other hand, suffers from reaction when he comes out of the line still alive and unhurt. Such a one seeks comfort, warmth and that "mother love" which he cannot get from mother, wife or sister, but which he finds in the arms of a prostitute.

(7) The young civilian often has his girl friend to whom he is reasonably faithful, and, even if sexual intercourse takes place, venereal disease rarely results. The

ng soldier has to seek his contacts when and where he can: frequent moves
rent lasting friendships and casual pick-ups are the rule.

3) There is an all too common belief that sexual abstinence is harmful; at home,
tification of the sex impulse is less likely to lead to venereal disease than abroad,
re the number of infected persons is almost everywhere much greater.

)) Poverty and starvation, so common in war-scarred countries, have led to
1y women bartering their bodies for a tin of bully or a loaf of bread; thus the
lier meets temptation at every turn.

PREVENTION

r this explanation of the position, it is well now to see how the problem can
tackled. Most of those who know the soldier are agreed that promiscuity is
uestion of morale rather than of morals. All experience goes to show that the
ereal disease rate is always lower in a well-disciplined unit than in a slack one;
lition and *esprit de corps* are excellent deterrents to fornication.

:he prevention of venereal disease falls naturally into two sections: first, the
vention of promiscuity and, secondly, the prevention of the development of
ereal disease in those who have been promiscuous.

To prevent the soldier from promiscuity, he has to be convinced that it is
ecessary, unwise and potentially dangerous, and at the same time he must be
vided with a satisfactory alternative. At first sight, education would appear
be one of the most hopeful lines, and lectures and talks the most convenient
is of conveying information. Unfortunately, the number of people who know
t to lecture on venereal disease is strictly limited; in an army of several millions,
le hundreds, or even thousands, of lecturers would be needed, and they simply
not exist. Medical and combatant officers do their best but few are very
vincing; besides, education takes a long time, and sex education, to be effective,
uld probably start before puberty.

There is plenty of evidence that boredom and alcohol are fruitful causes of
miscuity. These are undoubtedly best countered by Welfare with a capital "W":
s means the provision of clubs, rest rooms, libraries, games, entertainments,
iteens, and the like, most of which are to be found in all theatres of war. The
itish Tommy in war is probably better provided with all these amenities than
would be as a civilian in peace time, but he can only get access to them on leave
in the bigger towns, it takes time to get them under way, and they can only be
iilable where large bodies of troops are concentrated.

Then there is the religious side. The Army has every right to be proud of the
cord of its padres, but they are often grossly overworked and have little time for,
d less experience of, anti-venereal disease educational work. In any case, all
perience goes to show that the type of man who contracts venereal disease is not
e type who would usually be deterred by religious scruples; in fact, one investiga-
n demonstrated that it was the very men who were presumably the most religious
ho showed the highest incidence of disease.

Brothels and prostitutes.—More often than not it is quite impossible either to
ose the former or get rid of the latter. In many countries, brothels are recognized
old-established institutions, so that any attempt at closure would not only meet

with powerful resistance but might lead to serious political repercussions. Not only that, but there are towns where almost every café and every restaurant is a potential brothel and where many single rooms are at the disposal of ladies of easy virtue. In most foreign countries prostitutes are of two main kinds, the regulated and the clandestine: the former are licensed by the authorities, are subject to definite regulations, and are examined periodically. The examination is usually extremely perfunctory, and what is there to prevent a woman contracting or developing venereal disease between weekly or monthly examinations and infecting many men during these periods?

Clandestine prostitutes are even more difficult to control: if they are chased away they merely re-appear elsewhere. Even at home the problem seems insoluble in the larger towns, and especially in London, where troops collect on leave brothels exist and prostitutes ply their trade with little hindrance. The powers of the police are limited; in order to arrest a prostitute a constable must be satisfied that solicitation caused annoyance—difficult enough in daylight and impossible in the black-out. Moreover, when a prostitute is brought before a magistrate she usually pleads guilty and is fined 40 shillings, a sum which she can earn several times over in a single night. Small wonder then that so many soldiers acquire their infections on leave in London.

Avowed prostitutes are not accepted in the Services nor directed into industry; there remains therefore only rehabilitation, which is a long-term policy and unlikely to affect appreciably the venereal disease rate in this war.

What then can be done to counter the activities of brothels and their inmates? The answer is to put all brothels out of bounds; so far as possible this is done, but where these institutions are dotted all over any given town, this would mean putting the whole place out of bounds to troops and denying the men the amenities of the shops, cinemas, cafés, and such-like. Military police may picket the larger and better-known brothels, but it is quite impossible to cover them all. It would take an army in itself. There are many who favour officially recognized brothels reserved for Service men; in theory this policy has much to recommend it, but in practice it does not work, and in any case the effect on the morale of troops must inevitably be harmful, to say nothing of that on public opinion.

Then there is the enthusiastic amateur or "good-time girl," who seems to be particularly attracted to uniform and who will be found wherever there are Service men with money to burn. No solution of this problem has so far been found, and yet it is these women who are responsible for the vast majority of Service infections in the United Kingdom.

Prophylaxis.—From the foregoing, it will be obvious that additional and more positive measures are necessary to keep down the Army venereal disease rate. For those who are promiscuous, in spite of everything that can be done, there remains prophylaxis, which may be mechanical or chemical, or both. The former is represented by the condom; but here again a difficulty arises, because it is considered that public opinion would not countenance their official provision at home, and in any case there are many who would not use them. Personal disinfection *after* exposure is the official policy, and if carried out efficiently and early this method would probably prove 90 per cent. or more effective. It is a curious fact that the

erage soldier will employ this method overseas, at any rate in the East, but at me it is doubtful if 5 per cent. of soldiers ever use it, and those who do, only the most perfunctory manner or far too late. It is a matter for wonder why this so. Perhaps the soldier thinks that the enthusiastic amateur is safe, although he lizes that the foreign prostitute is not. There can be no doubt that in foreign tions prophylaxis has always been much more fashionable than at home. other method which has been tried and proved successful, is the oral use of lphonamides, but the objections to this seem far to outweigh its advantages, and hough it may be possible in large camps, it would not be practicable in small lated units or in billets.

TREATMENT

re, theoretically at any rate, the army is on a good wicket. With the exception a proportion of early cases of uncomplicated gonorrhœa, all venereal disease cases admitted to hospital and treated under more or less ideal conditions by well- alified specialists. All the most modern and effective drugs and equipment are ailable and cure is usually rapid. In one respect the soldier with venereal disease at a disadvantage: he cannot keep the fact secret as the civilian can. Although ich progress has been made in doing away with the stigma attached to venereal ease, to the extent of removing almost all penalties in connexion with it, and en of having nursing sisters in venereal disease wards—an unthinkable procedure enty years ago—nevertheless, there still remains a feeling amongst many that soldier with venereal disease is unclean, a sort of leper, a man to be avoided to be given all the dirty work to do. This undoubtedly affects his morale. will be years before this feeling is completely eradicated, yet to-day the lot of venereal soldier is a bed of roses compared with what it was in the last war. *Chemotherapy.*—The advent of the sulphonamides and penicillin has solved my problems and reduced enormously the time spent in hospital. There still main, however, types of syphilis which are not suitable for penicillin therapy d which must be treated by standard methods over long periods. So long as oldier is in a static unit, weekly attendance at hospital for injections or observation esents few difficulties, although it is not always easy to persuade a Commanding icer that treatment is as important as training; but in theatres of war, or where its are constantly on the move, it is often almost impossible to keep track of a man, d treatment becomes irregular, often with unfortunate consequences. None the s, it can be said without hesitation that the Service man, on the whole, gets far tter treatment than his civilian counterpart. In this connexion, it has been sug- sted that most cases of venereal disease are cured so rapidly nowadays that the tient regards an attack as no more than a cold in the head, and therefore becomes s careful to avoid infection. Such a suggestion may be regarded with scepticism the case of white men, but it is certainly true of certain native races.

FOLLOW-UP

or the reasons given above, this presents enormous difficulties and at the same time nvolves a vast amount of documentation and clerical work. Once the patient leaves ospital the medical department largely loses control of, and touch with, him.

When the number of venereal patients in an army of several million men, scattered all over the world, is considered, the task of getting each one back at regular intervals for observation and tests of cure is stupendous. It might be thought that the Medical Officer of the unit would see to this automatically, but it is not generally realized that the unit Medical Officer is a very busy man, often with several units under his medical care, and constantly being moved, or with little chance and less incentive to interest himself in the apparently healthy men of his unit. Further the subject of venereal disease is so little taught in medical schools that few medical officers realize the supreme importance of regular treatment, adequate observation and tests of cure. This last casts no aspersion on the medical officer, but rather on the system under which he was trained.

To give some idea of the amount of time and paper work involved, one example will suffice:—

Private X. of the Blankshire Regiment should have attended at a Military Hospital for his final test of cure of gonorrhœa on a given day. At the end of the day, when the venereologist has seen perhaps 150 patients, it is found that Private X. has not attended. An already overworked orderly (clerks are in short supply) sits down and sends a letter to the Commanding Officer of Private X's unit, saying he has not attended; a reply comes back, often after several days, owing to postal delays, that the man has been sent on draft ABC. An application to Records elicits the answer that this draft has gone to, perhaps, the Middle East, and information has to be sent to this theatre, where the patient is eventually found and examined—always supposing that the letter has not been lost on the way as the result of enemy action.

This is a simple straightforward case, only involving six or seven letters and a delay of perhaps a month, but when things do not go so smoothly, and when there are hundreds and thousands of soldiers like Private X, it will be realized that the problem becomes prodigious.

LEAVE

It has been stated that a considerable proportion of cases of gonorrhœa, apparently treated effectively with the sulphonamides, still harbour gonococci for anything up to three months following apparent cure. *Should such a soldier be allowed his regular leave during his period of three-months' observation?* If he is a married man may he not infect his wife? Yet would it be fair to penalize all cases under observation by stopping their leave? Here venereologists are in a cleft stick—on the one hand they fight against penalties, on the other they allow a man perhaps to infect his wife when this could be prevented. Then there is the question of compassionate leave: a soldier under treatment in hospital for gonorrhœa hears that his child is seriously ill. He must surely be allowed to go home, yet will he not be likely to infect his wife? It is all very well to warn him of the risk, but if he has not seen her for months, he will need to be strong-minded to avoid sexual intercourse, more especially if all his clinical signs have disappeared.

DEMOBILIZATION

When a soldier leaves the Army whilst under treatment or observation for venereal disease, what is to be done? He may be given notes of his case (Ministry of Health

m V.15) and told to go to the most convenient civilian venereal disease treatment tre, or arrangements may be made for him to attend for free treatment at a litary Hospital, but will he go? He cannot be compelled. When general nobilization takes place, the ideal in theory would be to submit every soldier to a um test for syphilis so as to ensure that the Army does not introduce a large amount syphilis into the civilian population, especially from abroad. But think what h a task would involve—several million blood tests to be done in a limited period pathologists who already have more than they can do. If the result of any given were negative, all would be well, but could the soldier be held pending receipt he result, which in the most efficient system might take several days before it ame available? On the other hand, what if the result is positive? This would an a repeat test to exclude technical or clerical error, and more days lost. en if the repeat test is positive the man would have to be examined, clinically l radiologically, and, even if such examination were negative, think of the chological effect. On the other hand, if every man showing a positive or doubtful were referred to a civilian clinic, could these hard-worked institutions cope h the numbers? Do the possible advantages to the public health outweigh the idvantages? Truly it is a knotty problem.

COMPLAINTS

stly, here are some of the minor problems. Few people can have any idea of sort of letters which reach the War Office from well-meaning but often ill-ormed people, morality societies, worried parents, prudish parsons, and a host others. (Incidentally all such complaints or questions are investigated most efully.) "Why do you encourage vice by giving the soldier prophylactics" or, re often, "contraceptives"? We hasten to reply that we do not encourage vice, but do recommend personal disinfection *after* exposure to infection. Or again, ly son has contracted VD, why was he not warned against it?", to be set unst the indignant mother whose son's mind has been poisoned by "listening a lecture all about that filthy subject." Then there is the parent who accuses the my authorities of herding his offspring in a barrack room with a lot of soldiers ffering from syphilis, quite oblivious of the fact that these cases are under treat-nt or surveillance and would never be allowed out of hospital until they were n-contagious. Finally, there is the outraged cleric who has it on unimpeachable thority that a Medical Officer recommended sexual indulgence as good for the alth, but who fails to produce this evidence or the name of the Medical Officer d seems not to realize that the Army authorities cannot hold themselves respon-le for the personal opinions of each individual officer. These are but a few of e venereal disease problems which crop up in the Army, but they do tend to show at the path of the administrator and the venereologist is somewhat thorny, and at some credit is due to them for the fact that, with the possible exception of the ussian, the British Army has a lower venereal disease rate than any army in the orld.

Examine the urine.—The presence of albumin in the urine may be a sign of renal damage and may indicate the cessation of treatment, temporarily. The presence of bile salts, as indicated by Erhlich's reaction or Hunter's test, may be a warning of impending jaundice. Treatment should be stopped or modified.

(4) Control your treatment by periodic clinical and serological examinations.

(5) When it is considered that the patient has received enough treatment to be cured, a period of observation should be arranged. Serological tests should be performed once every three months for the first year, every six months for the second year, and then once yearly for the next three years. In every case the spinal fluid should be examined before the final cessation of treatment and again before the patient is finally discharged. The examination should include the following tests:—A Wassermann reaction, a Lange colloidal gold curve, a cell count and globulin reaction. These all must be satisfactory before a definite opinion is expressed.

CLINICAL STAGES OF SYPHILIS

Experience has shown that from a treatment standpoint, at least, syphilis must be split up into more or less definite clinical stages. These are as follows:—

(1) *Sero-negative primary stage.*—This occurs roughly twenty-one to twenty-eight days after inoculation has taken place. A chancre, which is really an eroded papule, appears at the site of inoculation. This sore is usually situated on the genitalia but may occur on any mucous surface. Diagnosis during this stage depends upon finding the *T. pallidum* by the dark-field method.

(2) *Sero-positive primary stage.*—This occurs about twenty-one days after the appearance of the chancre. The serological reactions have now become positive.

(3) *Secondary stage.*—This stage is characterized by the presence of polymorphic skin eruptions. From a treatment point of view it should be divided into early and late. The late secondary manifestations should be treated as early tertiary cases. The serological reactions are invariably positive.

(4) *The latent stage.*—This is probably the most difficult stage to assess, owing to the fact that clinical signs are absent. The only evidence that the patient may be suffering from syphilis is from the serological reactions. This stage may result from the natural progress of the disease or from the fact that the patient has been insufficiently treated or has failed to react to the treatment given. Into this category, undoubtedly, fall a large number of congenital cases which have been previously missed or forgotten.

(5) *The tertiary stage.*—This stage has to be subdivided into different categories according to the site of the lesion. The main tissues affected are:—

    (*a*) The skin and mucous membrane
    (*b*) The viscera
    (*c*) The skeletal structures
    (*d*) The cardiovascular system
    (*e*) The meningovascular system
    (*f*) The central nervous system
        (i) The cord: tabes dorsalis
        (ii) The brain: general paralysis of the insane
        (iii) A combination of (i) and (ii): tabo-paresis

AVAILABLE THERAPEUTIC PREPARATIONS

ᵗₙ the treatment of syphilis two sets of drugs are mainly employed, namely, the senical preparations and bismuth.

ARSENICAL COMPOUNDS.—The arsenical preparations can be divided into ree groups:—

Trivalent compounds.—These consist of:—

(1) Arsphenamine—the original "606": In some quarters this is still considered the best intravenous preparation for the treatment of early syphilis. Its preparation, however, is laborious and difficult and as a result it is often very toxic. It has therefore fallen into disfavour.

(2) Neo-arsphenamine—"914": This is the intravenous preparation most generally used. There are many proprietary brands on the market, such as evarsan, neo-kharsivan, novarsenobillon, which, under the English system of control, vary little in quality. The preparation is prepared by dissolving it in 10 c.cm. of sterile water.

(3) The sulpharsphenamines: These preparations are given intramuscularly or deep subcutaneously and are used when intravenous therapy is contraindicated, such as in obese patients or quite small infants. They are believed by some observers to produce blood dyscrasias. Close observation is essential.

Pentavalent compounds.—This type of preparation is mainly used in tertiary philis, especially in the treatment of tabes dorsalis and early general paralysis the insane.

Tryparsamide or acetylarsan are those most commonly used. An oral preparation ₁own as stovarsol, spirocid or orarsan, is used in the treatment of congenital philis.

The pentavalent compounds seem to have a special toxic effect upon the optic ᵣve and close watch should be kept upon the visual fields during their lministration.

The arsenoxides.—Mapharsen and neo-halarsine are the preparations used in ₁e intensive treatment of syphilis. They are claimed to be more active though ss toxic than the neoarsphenamines. Both these preparations have to be given tensively to be of any therapeutic value, owing to the rapidity of their excretion om the body.

BISMUTH PREPARATIONS.—These may be classified as follows:—

(1) Water-soluble compounds
(2) Bismuth-arsenic combinations
(3) Metallic suspensions in water or glucose
(4) Insoluble compounds suspended in water or glucose
(5) Insoluble compounds suspended in oil
(6) Soluble compounds dissolved in oil

Types 3 and 4 are the most commonly used. The oily preparations are difficult ₀ handle, and to maintain strict sepsis is not easy.

IODIDES.—Iodides are prescribed in syphilis, not because they have any anti-spirochætal value, but because they are believed to absorb fibrous tissue. This permits the anti-spirochætal drugs to penetrate better into the syphilitic foci or cell nests. They are mainly employed in the treatment of tertiary lesions.

PRE-WAR TREATMENT

I am calling this the pre-war treatment because it is an established, tried and proven line of treatment. In the vast majority of clinics some form of it is still being employed to-day. Its administration may take somewhat longer than some other forms of treatment, but it is highly suitable for out-patient clinics and it is known to effect a cure in a large percentage of cases. Two main schemes are in use, namely:—

    (1) The intermittent concurrent
    (2) The continuous alternating

Intermittent concurrent.—The simplest form of this consists in giving ten injections of arsphenamine and ten injections of bismuth to constitute a course. The dosage of arsphenamine consists of 0·45 to 0·60 gm. in the female and 0·45 to 0·75 gm. in the male; that of bismuth is 0·2 gm. to 0·4 gm. A three weeks' rest then intervenes, during which time a potassium iodide mixture is prescribed before the beginning of the next course. The number of courses given depends upon the stage of infection when the treatment was started. Two full courses are usually given after the Wassermann reaction has become negative, with a minimum of eighteen months' to two years' treatment. A variation of this is the course which I now use at the Whitechapel Clinic:—

Week	Arsenic	Bismuth	Iodides
1	0·6 gm.	0·2 gm.	
2	0·6 ,,	0·2 ,,	
3	0·6 ,,	0·2 ,,	
4	0·6 ,,	0·2 ,,	
5	0·6 ,,	0·2 ,,	
6	0·9 ,,	0·2 ,,	
7		0·4 ,,	15 grains t.d.s.
8		0·4 ,,	20 ,, ,,
9		0·4 ,,	25 ,, ,,
10		0·4 ,,	30 ,, ,,
11 to 20	Repeat 1 to 10		
21 to 26	Repeat 1 to 6		

The injections of the arsphenamine are split up into equal doses and given twice weekly. Blood tests are taken at the seventh, seventeenth and twenty-sixth weeks. In the sero-negative stage one course is given; two courses are given for the sero-positive stage and three courses for the secondary stage. There is an interval of one month between each course.

It is believed by some observers that the overlapping of the heavy metal and the arsphenamine tends to diminish the risk of neurological relapses.

Continuous alternating treatment.—Burke was the exponent of the continuous alternating method of treatment and may be said to have been the originator of

intensive therapy. In this form of treatment no rest intervals occur. It is claimed that this does away with any risk of the parasite "digging in" during the time treatment is suspended. It is also claimed that the extra strain placed upon the liver, kidneys and skin is reduced to a minimum, thus the risk of such complications as dermatitis, jaundice and gingivitis is avoided. Furthermore, it is claimed that the chance of "reagin fastness" is also reduced, as a constant attack is maintained on the parasite, which is subjected to bombardment by different reagents before it has time to become resistant to any one of them.

The schedules, which are as follows, are mathematically designed to cure the patient, provided the treatment is received within a certain time period:—

Schedule 1 (sero-negative)

Weeks	1–13	..	arsphenamine ..	..	1 gm. per week
	14–17	..	stabismol	..	..	2 c.cm. weekly
	18–22	..	arsphenamine ..	..	1 gm. per week
	23–26	..	stabismol	..	..	2 c.cm. weekly

Schedule 2 (sero-positive)

Weeks	1–13	..	arsphenamine ..	..	1 gm. per week
	14–17	..	stabismol	..	..	2 c.cm. weekly
	18–25	..	arsphenamine ..	..	1 gm. per week
	26–29	..	stabismol	..	..	2 c.cm. weekly
	30–34	..	arsphenamine ..	..	1 gm. per week

Schedule 3 (secondary)

Weeks	1–13	..	arsphenamine ..	..	1 gm. per week
	14–17	..	stabismol	..	..	2 c.cm. weekly
	18–25	..	arsphenamine ..	..	1 gm. per week
	26–29	..	stabismol	..	..	2 c.cm. weekly
	30–35	..	arsphenamine ..	..	1 gm. per week
	36–40	..	stabismol	..	..	2 c.cm. weekly

Schedule 4 (late secondary)

Weeks	1–13	..	arsphenamine ..	..	1 gm. per week
	14–17	..	stabismol	..	..	2 c.cm. weekly
	18–27	..	arsphenamine ..	..	1 gm. per week
	28–32	..	stabismol	..	.. 1	2 c.cm. weekly
	33–42	..	arsphenamine ..	..	1 gm. per week
	43–48	..	stabismol	..	..	2 c.cm. weekly

Schedule 5 (latent)

Weeks	1–4	..	arsphenamine ..	..	1 gm. per week
	5–8	..	stabismol	..	..	2 c.cm. weekly
	9–12	..	arsphenamine ..	..	1 gm. per week
	13–20	..	stabismol	..	..	2 c.cm. weekly
	21–28	..	arsphenamine ..	..	1 gm. per week
	29–36	..	stabismol	..	..	2 c.cm. weekly
	37–42	..	arsphenamine ..	..	1 gm. per week
	43–50	..	stabismol	..	..	2 c.cm. weekly
	50–54	..	arsphenamine ..	..	1 gm. per week
	55–58	..	stabismol	..	..	2 c.cm. weekly

In these schedules the arsenical injections are given three times a week in a dosage of 0·25, 0·30 and 0·45 gm. respectively.

It is found in practice that the dosage is heavy and that few patients will stand 1 gm. of arsenic per week. Most patients also find it difficult to attend hospital three times each week.

THE SPEEDING-UP PROCESS: METHODS OF ADMINISTRATION

The arsenoxides are the preparations used in the intensive forms of treatment as the arsphenamines were found to be too toxic. Moore (1944) has pointed out that the rate of treatment cannot be speeded up without decreasing the safety margin. He gives the following figures:—

Method of administration			Total duration	Total dose of mapharsen	Estimated mortality
Intravenous drip	..	..	5 days	1,200	1 : 200
Twice daily injections	..	..	10 days	1,200	1 : 300
Daily injections ..	..	..	3 weeks	1,200	1 : 400
Tri-weekly injections	..	..	6 weeks 8 weeks 10 weeks	1,080	1 : 400–1 : 1000
Twice-weekly injections		..	10 weeks 20 weeks	1,200 2,400	1 : 1000–1 : 3000
Weekly injections	..	..	40 weeks	2,400	less than 1 : 3000

The following methods have been used:—

The slow continuous drip method.—Mapharsen is administered at the rate of 240 mgm. per day for five days. This amount of the drug is dissolved in 2,400 c.cm. of 5 per cent. glucose solution and is given intravenously at the rate of 200 c.cm., containing 20 mgm., per hour for twelve hours.

Rapid continuous drip method.—In this method 1·2 gm. of mapharsen per pound body weight, with a maximum dose of 180 mgm., dissolved in 1,000 c.cm. of 5 per cent. glucose solution, is given. The gravity drip is so arranged that this amount requires sixty to seventy-five minutes for administration and the injection is repeated daily for five days.

Multiple injection method.—The injections are given by means of a syringe. The dosage of mapharsen employed is 60 to 100 mgm., once or twice daily. The injections are repeated each day until a total dosage of 1,200 mgm. of mapharsen has been given. This is the method most generally adopted.

Fever therapy plus multiple injections.—It is believed that the addition of fever therapy decreases the toxic effects of arsenic. The employment of heat therapy, however, requires special apparatus, such as the Kettering hypertherm or an inductotherm. Specially trained hospital staff are also required. If these are not available, fever can be induced by intravenous injections of T.A.B.

One-day fever, arsenic-bismuth method.—An intramuscular injection of 4 grains of bismuth salicylate is given twenty-four hours before artificial fever therapy is started. The patient is then subjected to continuous fever for ten hours at a temperature of 105° to 106° F. He is also given 120 mgm. of mapharsen in divided dosage, by the syringe method, during the height of the febrile reaction.

These methods all require hospitalization and strict observation during treatment, which is a considerable drawback. An intensive course suitable for outpatient treatment can, however, be given, using neo-halarsine. Three injections are given per week, the dosage varying from 0·06 to 0·09 gm., combined with 2 c.cm. of bismuth weekly, for twelve weeks. The defaulter rate is, however, high, and few patients keep up their regular attendances three times weekly.

PENICILLIN

The preliminary reports on the treatment of syphilis with penicillin seem to be highly satisfactory as regards the early stages of the disease. It is, however, much too soon to make any definite claims, and relapses are known to occur.

The treatment consists of the administration of 2,400,000 Oxford units, divided into sixty equal doses, and spread over a period of seven-and-a-half days. The injections have to be given continuously every three hours day and night. No serious ill-effects have been reported but severe Herxheimer reactions have been known to occur.

With all these intensive methods, it should be pointed out that sufficient time has not yet elapsed for any definite statement to be made regarding their permanent cure of the disease.

Moore (1943) has also pointed out that the introduction of intensive arsenotherapy has apparently—"perhaps as much as twelvefold"—increased the incidence of reinfection.

In a large proportion of the cases the blood reactions do not become negative until six months to a year after the cessation of treatment.

TREATMENT OF TERTIARY SYPHILIS

Bismuth and iodides are the drugs of choice in the treatment of tertiary syphilis. Arsenicals should be used with great care in patients over the age of fifty. In meningovascular and cardiovascular syphilis there is a danger of producing an Herxheimer reaction, which is a flaring-up of the syphilitic process. Results in these patients, and in those with throat lesions, may even prove fatal, and it is therefore wise to start treatment with the slow-acting drug, bismuth, and then, if it is deemed necessary, to begin with small doses of arsenic. I give a series of twenty-week courses of bismuth oxychloride in 0·4 gm. doses, combined with a potassium iodide mixture, 15 to 30 grains t.d.s.

Gummas and cutaneous lesions, however, do well on arsenic, and in robust healthy persons, provided they are watched carefully, there is no contraindication to its use.

TREATMENT OF TABES DORSALIS AND GENERAL PARALYSIS OF THE INSANE

When it has been ascertained, by clinical observation and by examination of the cerebro-spinal fluid, that a person is suffering from one or other, or a combination, of these complaints, the drug of choice in their treatment is tryparsamide. This should be given intravenously in doses of 1 to 3 gm. per week for ten weeks. A course of ten injections of bismuth should then be given, and so on until there is evidence that the patient has had enough treatment. During the tryparsamide treatment, as already pointed out, a close watch must be kept on the visual field as there is a danger of optic atrophy occurring. If the patient does not show any serological or clinical improvement, a course of malarial therapy should be instigated, provided the general condition warrants such measures. The patient is infected with benign tertian malaria, either by allowing an infected mosquito to bite the patient or by an intramuscular injection of blood from an infected person. The former is preferable and the most certain to "take." When it is considered that sufficient paroxysms have occurred, the malaria is terminated by the administration of quinine dihydrochloride, 5 grains daily, for a week or fifteen days. This type of treatment can only be carried out efficiently and safely when the patient is hospitalized. Strict attention and careful nursing are essential.

The earlier the patient starts treatment, the better the prognosis, but it should be remembered that the treatment itself is not without risk.

CONCLUSIONS

This brief summary of the modern treatment of syphilis would not be complete unless the following question were asked:—If you contracted syphilis, what form of treatment would you prescribe for yourself? In the present state of knowledge my answer would be that I would have the seven-and-a-half day treatment with penicillin, but that I would want it followed up by treatment with neoarsphenamine and bismuth.

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THE MODERN TREATMENT OF GONORRHŒA IN THE MALE

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IN the past ten years notable advances have been made in the treatment of gonorrhœa. Before this time, gonorrhœa could be cured only by patient and protracted local measures; complications were frequent and occasioned much invalidism. The introduction of the sulphonamide group of drugs and, more recently, the availability of penicillin, have dramatically changed the outlook, making cure much more rapid and certain, and diminishing the incidence and severity of complications, whilst the application of fever therapy has proved of great value in minimizing the loss of time in refractory or complicated cases. The objects of treatment still remain the same—to curtail the period of infectivity and to secure eradication of the infection at the earliest possible moment, thus preventing risks to others and the dangers of persistent infection in the individual.

The principles of the successful treatment of gonorrhœa in the male can be summed up as follows:—

(1) Accuracy of bacteriological diagnosis and investigation as to the anatomical areas involved.

(2) Adequate dosage of the chosen drug over an adequate time period.

(3) Careful surveillance after cessation of symptoms, or apparent cure, to exclude the possibility of residual infection leading to early or late relapse.

DIAGNOSIS

The symptoms and signs of gonorrhœa—dysuria, increased frequency of micturition, urethral discharge, urinary turbidity and, less commonly, prostato-vesicular changes—are also common to any bacterial infection of the lower genito-urinary tract. Confirmation of the clinical suspicion can be made only by the demonstration of the gonococcus in smears or cultures made from the urethral secretion. It is important that the specimen should be taken from within the meatus after the glans penis has been carefully cleansed. Chemotherapeutic treatment should not be started until a positive bacteriological report has been received. The gonococcus is usually easily demonstrable, but in some cases the examination of a second, or even a third, specimen is necessary before laboratory confirmation of the diagnosis is obtained. If a placebo is required during this period, a potassium citrate mixture should be prescribed.

The anatomical extent of infection is determined by the two-glass urine test:—

The patient is instructed to pass 5 to 6 ounces of urine into each of two conical urine glasses. The contents of the first glass indicate by turbidity or admixture of pus threads the degree of inflammation of the anterior urethra, whilst the second glass shows whether or not the posterior urethra is involved.

This test is rapid and convenient in practice, but is liable to the fallacies arising from incomplete clearance of all pus from the anterior urethra or from washing out all the pus from the posterior urethra, fallaciously indicating or excluding involvement of the posterior urethra. A more accurate method of carrying out the test is by washing out the anterior urethra with a cold, clear lotion until the washings are returned clear. Haze in the urine subsequently passed indicates a posterior urethritis.

The patient should be warned of the potential seriousness of his condition and the necessity for undergoing adequate treatment and tests of cure. Risks to others should be prevented by the strictly personal use of towels and other toilet articles, and by the avoidance of soiling bed-linen with discharge. His cooperation should be sought in influencing to attend for investigation and treatment the possible source of infection and any other individuals subsequently exposed.

TREATMENT

Treatment of the established infection may be considered under three headings:-
  (1) General
  (2) Chemotherapeutic
  (3) Local

GENERAL.—In gonorrhœa, as in other acute infections, absolute rest in bed is advisable. This is impossible in many cases treated as out-patients, but at least all heavy physical work or strenuous physical exercise should be interdicted. The diet should be non-stimulating, avoiding spices, pickles, and alcohol. Careful regulation of the bowels is essential. An abundant fluid intake should be insisted upon, at least 6 to 8 pints a day—water, tea, fruit juice, and such-like. In the less temperate climates the urinary output is a better guide, if the renal complications of sulphonamide therapy are to be avoided. The urinary output should be maintained at the daily level of 50 to 70 ounces. The value of alkaline diuretics, such as potassium citrate, appears to be of doubtful value during the administration of sulphonamide. The strict avoidance of sulphur-containing foods, such as eggs and onions, is no longer considered necessary. Violent purges, however, especially magnesium sulphate, should be avoided.

SULPHONAMIDE THERAPY.—The drugs now chiefly employed are sulphathiazole and sulphadiazine. Sulphapyridine is seldom used, except when the other two drugs are not available, because of its lesser therapeutic activity, and because of the greater incidence of toxic sequelæ following its administration. There appears to be little difference between the therapeutic effectiveness of sulphathiazole and sulphadiazine: the latter, in my experience, has been less productive of side-effects.

Dosage.—It is well recognized that the greatest certainty of cure follows the establishment and maintenance of an effective blood concentration of the drug chosen. This may be attained in ambulant patients by the administration of 5 gm. daily, in divided doses, for a period of five days. There is no advantage in continuing sulphonamide administration beyond the fifth day; the cure rate is not increased thereby, and there is a marked increase in toxic sequelæ. Shorter courses, in general, do not give such a high percentage of cure as the five-day course, unless a more intensive dosage—6 to 7 gm. daily—is adopted. This is often

inadvisable in ambulant patients. Sub-optimal dosage leads to immediate failure to cure, as shown by the persistence of clinical signs, and to the development of sulphonamide-resistant strains of the gonococcus, making subsequent treatment more difficult. The daily dosage of 5 gm. of the sulphonamide should be given in three doses, spaced at eight hours as nearly as is possible; and a little time spent in discussing with the patient the most convenient times may make all the difference between success and failure. Three tablets ($1\frac{1}{2}$ gm.) should be taken after the morning meal, $1\frac{1}{2}$ gm. approximately eight hours later, i.e. in the early afternoon, and 2 gm. before retiring to bed. The heavier evening dose is advised because in many cases it is found that the interval between this dose and the first in the morning may exceed the optimal eight hours. The tablets should be crushed, or chewed, and swallowed with a large draught of fluid.

During sulphonamide therapy there is a twofold action, inhibition of bacterial growth by the drug, and destruction of the damaged organisms by phagocytosis or bacteriolysis. Any factor tending to inhibit this mechanism—underdosage of the drug, the consumption of alcohol, even in small quantities, or local tissue trauma—may lead to chemotherapeutic failure. In successful cases there is rapid clinical improvement: within twenty-four hours the urethral discharge has become much less, and is completely absent in from forty-eight to seventy-two hours. The urinary haze clears rapidly, and by the third day only a fine flocculate of threads can be seen. The bacteriological progress parallels the clinical: after twenty-four hours, gonococci cannot be detected in urethral smears; there is, however, a varying amount of pus which gradually diminishes and is absent after the third day.

The most favourable time to examine for the presence of urethral discharge is early in the morning, when the patient has retained the urine overnight. This is also the best time to collect specimens of the secretion for microscopical examination. If necessary, it may be left to the intelligent patient to collect the specimen. He should be supplied with two glass slides, and instructed to collect a drop of secretion on the centre of one by touching it to the meatus. This drop should be spread evenly and thinly by the edge of the second slide. The specimen is then left to dry.

The cessation of signs and symptoms, and the negative bacteriological findings do not, however, indicate certain cure. Observation and repeated tests over a period of at least three months are necessary to justify this assumption. The schedule of treatment and observation of a primarily successfully sulphonamide-treated case may be summarized:—

Day		
1	Full clinical examination	Sulphonamide treatment started
	Bacteriological confirmation of diagnosis of gonorrhœa	
	Serological test for syphilis	
2—5		Sulphonamide treatment continued
6	Full clinical examination	
	Urethral and prostatic smears taken	
13, 20, 27, 34, 62, 90	Full clinical and bacteriological examination	
118	Final tests	
	Full clinical and bacteriological examination	
	Anterior urethroscopy; passage of full-sized curved	

bougie; provocative injection of ½ c.cm. poly-
valent gonòcoccal vaccine, or irritation of urethra
with 1 : 5000 solution of silver nitrate
Clinical and bacteriological examination in twenty-
four to forty-eight hours
Serological test to exclude possibility of concomi-
tant syphilis

During the period of surveillance the clinical and bacteriological findings shou
be consistently negative and, in addition, in the final tests, urethroscopy shou
show a completely normal mucous membrane without pathological changes in t'
glandular or submucosal structure. Serological tests for the exclusion of syphi
should never be omitted: dual infection with syphilis and gonorrhœa occurs
from 5 to 10 per cent. of infections.

From 50 to 60 per cent. of cases treated by sulphonamides require no furth
treatment other than the first course and are shown by the subsequent surveillan
to be cured. This percentage may at first sight appear low. In the early days
sulphonamide therapy, a cure rate variously estimated at from 80 to 95 per cei
was claimed to follow a single course of chemotherapy. In the intervening yea
this cure rate has shown a progressive drop. It has been shown that *in vitro* t
gonococcus develops a tolerance to the sulphonamides when exposed to increasi
concentrations of the drug. This chemo-resistance persists in sub-cultures a:
appears to depend upon the ability of the organism to synthetize para-aminobenze
acid, which inhibits the action of the sulphonamide. This factor partly explai
the lessened effectiveness of drug therapy. There is, however, in addition,
"host factor" which is shown by failure in a number of cases in which the infecti
organism is not drug-fast, and in which the sulphonamide dosage is adequate.

Sulphonamide-resistant cases.—Failure of sulphonamide therapy may be imm
diate and partial or complete, or it may be indicated by frank clinical relapse
the onset of complications, usually within a month of cessation of treatment a:
apparent cure. Partial failure is shown by the persistence of a scanty muc
purulent urethral discharge with some urinary haze, or at least an admixture
threads. The examination of smears shows the persistence of pus, and frequent
the presence of gonococci. In complete failure, a gross urethral discharge a:
urinary haze persist.

In these cases, continuance of sulphonamide therapy is valueless, and may le:
to drug sensitization of the patient or to blood dyscrasia. A careful clinic
examination and urine-glass test should be carried out to determine whether tl
persistent infection is limited to the anterior urethra, or involves, in addition, tl
posterior urethra. Obvious complications, e.g., prostatitis or vesiculitis, may l
found.

In addition to the factors already mentioned as liable to cause drug failur
it must be remembered that the sulphonamides are frequently ineffective in case
in which there are sealed-off, or intermittently draining, foci of infection. Th
presence of a marked discharge or urinary haze contraindicates the instrumenta
or urethroscopic investigation necessary in many cases to establish this pre
sumption.

Various methods have been advocated from time to time for the treatmen

of these cases of primary sulphonamide failure:—

(1) Local irrigation and administration of gonococcal vaccine followed by a second course of chemotherapy
(2) Fever therapy
(3) Penicillin

LOCAL TREATMENT.—Whilst there still exists considerable diversity of opinion whether local treatment is necessary or not during the acute stages, all are agreed that it is indicated in relapse or refractory cases.

Urethral irrigation should invariably be carried out by a gravity douche apparatus and Janet nozzle. The antiseptics most serviceable are potassium permanganate, 1 : 10,000 to 1 : 8,000, albargin 1 : 8,000, and oxycyanide of mercury 1 : 10,000. These dilutions are prepared by adding the requisite amount of 1 per cent. stock solution to the douche-can filled with water at 104° to 106° F. Opinion is also divided as to whether irrigation of the anterior urethra alone or irrigation of the anterior and posterior urethra should be practised. In view of the fact that the posterior urethra is involved in the large majority of cases reporting for treatment, posterior irrigation is the method of choice.

The urinary meatus is cleansed with soap and water, the tip of the Janet nozzle is inserted into the urethra sufficiently firmly to occlude it and the lotion is allowed to flow and gently distend the anterior urethra. The pressure of the irrigating fluid may be regulated by the height of the container or by partial occlusion of the rubber tube between the forefinger and thumb, the nozzle being held and directed by the other three fingers. The anterior urethra is completely cleansed by repeated distention and emptying of the urethra. This may take from ½ to 1 pint of lotion. After this has been done, irrigation of the posterior urethra is carried out by complete muscular relaxation, slow deep breathing, and at the same time straining slightly as if attempting to start urination; the irrigating fluid passes back and fills the bladder. The antiseptic is then voided, and the process repeated until 2 or 3 pints of lotion have been used.

Ten to twenty per cent. of the cases of partial failure following sulphonamide therapy will clear up after local irrigations for a few days.

Combined local treatment and vaccine therapy.—Better results, however, follow the combination of local treatment and vaccine therapy. An initial dose of 0·1 to 0·2 c.cm. of a detoxicated polyvalent gonococcal vaccine (50,000 million organisms per c.cm.) is followed by gradually increasing dosage, twice weekly, to a maximum of 1·0 c.cm. The subcutaneous route should be chosen; in in-patients the intravenous route may be preferred, in which case the initial dose should be 0·05 c.cm. This combined treatment is followed by marked clinical improvement, and in many cases by the complete cessation of urethral discharge and urinary haze. It is, however, advisable to give a second course of sulphonamides and preferably to change to a drug other than that used in the initial course. Cases reacting successfully to the second course of sulphonamides should follow the same surveillance schedule as for primarily successful cases.

Prostatic massage.—Failure of the second course of sulphonamides to cure is most frequently associated with closed or intermittently draining foci of infection in the glandular structures of the anterior urethra, or in the prostate or vesicles. If the urethral discharge is slight, and the urine test glass shows only a flocculate of threads, or when this has been accomplished by continuation of local treatment, a full investigation of the lower urinary tract should be carried out. Palpation and massage of the prostate and seminal vesicles, examination of smears made

from the expressed secretion, and turbidity or amount of threads in the urin
voided after massage, indicate the degree of involvement of these structure
If they are found to be infected, treatment by prostatic massage twice w..'!
with subsequent urethro-vesical lavage, should be instituted, and continued un
the smears are free from pus and organisms.

Urethral dilatation:—Involvement of the glandular structures of the anteri
urethra—the glands of Littré and the lacunæ of Morgagni—may, if marked, l
diagnosed by palpation of the urethra on a straight sound. Lesser degrees
infection, which may be equally responsible for protraction of infection, ar
submucous infiltrations, can be recognized only by anterior urethroscopy. Trea
ment is by massage on a straight bougie, dilatation of the urethra by means
Kollmann's four-bladed dilator, or suction by Mills's fenestrated bougie. Instr
mentation should be carried out at weekly intervals and should be followed l
urethral lavage. The progress of the case should be controlled by frequent clinic
and bacteriological examinations.

After local treatment has been continued for ten to twenty-one days, and accor
ing to the rapidity of the clinical progress, a third course of sulphonamides shou
be given. The majority of refractory cases will now react successfully.

Fever therapy has gained a valued place in the treatment of sulphonamid
resistant gonorrhœa, although it is to a large extent being displaced by the mo
recently introduced penicillin. It may be applied after failure of the first course
sulphonamides, concurrently with the second chemotherapeutic attack, or at son
later date. The temperature reaction may be attained by physical means (Ketterir
hypotherm, or inductotherm) or by the intravenous injection of bacterial deriv
tives (TAB or *B. coli* vaccine). The use of a hypotherm permits the temperatu
to be raised to, and maintained at, the desired level for periods up to fourteen hou
It has been found that a single fever session of eight hours at 106° F. will cu
over 95 per cent. of cases of refractory gonorrhœa; the remaining cases may requi
a second, or rarely a third fever session. If a hypotherm is not available, a seri
of from one to five fever reactions, resulting from the intravenous administratic
of TAB or *B. coli* vaccine at two or three day intervals, may be employed. Tl
initial dose is TAB, 25 million organisms, or *B. coli* 50 million, subsequent dosa;
being graduated to produce fevers of satisfactory height and duration. In cas
in which the temperature chart indicates that a satisfactory degree of fev
is not developing, a second injection of approximately half the dosage may l
made two to three hours after the first. By this means a fever level of 104° F.
maintained for from four to six hours. If bacterial fever therapy is employe
a further course of sulphonamides should be given subsequent to its terminatio

PENICILLIN

The recent availability of penicillin for the treatment of gonorrhœa has materiall
improved the outlook in cases of sulphonamide-refractory gonorrhœa, as well i
providing a rapidly effective means of curing recent infections. Penicillin
supplied in the form of a yellowish powder in sterile ampoules, each containin
100,000 Oxford units. Before use, the contents of the ampoule are dissolved i
10 c.cm. sterile saline solution, every precaution being taken to guard again
contamination.

A total *dosage* of 150,000 Oxford units administered in five equal doses of 30,000 units at three-hourly intervals is curative in nearly all cases. Injections should be made intramuscularly in the upper, outer gluteal quadrant. The necessity for this frequent administration, if the blood concentration of penicillin is to be maintained at an effective level, is inconvenient, except in the treatment of in-patients. Recent observations, however, suggesting that an effective blood concentration can be maintained for seven hours by giving penicillin powder in suspension in a mixture of beeswax and peanut oil, may make penicillin therapy more universally practicable. Romansky and Rittman (1944) have reported that a single intramuscular injection of this type, containing 100,000 units of penicillin, cured eleven out of twelve cases of gonorrhœa.

Penicillin is entirely non-toxic, but patients may experience some discomfort at the site of injection, varying from a slight burning sensation to a dull ache. Following the first injection, gonococci disappear from the discharge in from two to four hours, the urethral discharge rapidly becomes scanty and mucoid, and often absent after twelve to twenty-four hours. Subsequent observation shows the patient to be cured. Infrequently, a mucoid urethral discharge may persist for several days; the examination of smears shows this to contain no pus or gonococci. This discharge clears up spontaneously.

Possible failure of penicillin therapy is forecast by the persistence of a purulent urethral discharge. In my experience such cases have all reacted satisfactorily to a further dosage of 100,000–150,000 units of penicillin on the subsequent day.

Whilst the cure-rate of recent or complicated gonorrhœa treated with penicillin still remains at nearly 100 per cent., from analogy with other forms of therapy, failures are to be expected. The cure of such cases has so far been fully accomplished by repeated courses of penicillin; local treatment and fever therapy may, however, be required in the future.

In considering the duration of surveillance following apparent penicillin treatment of gonorrhœa, the effect of this drug on the syphilis must not be forgotten. A dosage of 100,000 units of penicillin curative for syphilis but is sufficient to heal a primary sore or to mask treatment. In a case recently seen, a primary sore with satellite adenitis and-a-half months after the successful penicillin treatment of contracted at the same time. Subsequent observation of penicillin should therefore follow lines similar to those advised for syphilis cases, but should include a final serological test at the fifth month.

CONCLUSION

Gonorrhœa in the male can be successfully treated by the proper handling of the means at present available to him, namely local irrigation and instrumentation, vaccines, and fever intravenous injection of TAB or *B. coli* vaccine.

This problem will be simplified when penicillin is available to be used for the routine treatment of all cases.

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THE MODERN TREATMENT OF GONORRHŒ
IN THE FEMALE

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W AR brings many evils in its wake, and not least among them is the undou increase in venereal disease. This war is no exception to the rule, but fortun: chemotherapeutic agents are now available, which are highly potent in the treati of gonorrhœa and are yielding promising results in the treatment of early syphil

The treatment of gonorrhœa in women in pre-sulphonamide days was a than! and disappointing task, entailing frequent attendances over a long period of t To-day, it is possible to promise a reasonable prospect of cure, in, at the n six weeks, although the period of observation and restriction from interco should be at least three months.

CLINICAL SIGNS AND SYMPTOMS

The most common manifestations of gonorrhœa are discharge and dysuri: would be expected, since most infections are originally cervical and uret Gonococcal vulvo-vaginitis of infancy is fortunately not common and will be (.with separately. Spread of the infection to the tubes and pelvic peritoneum have occurred by the time the patient seeks advice and a Bartholin abscess ma the first sign of infection. Gonococcal arthritis is rare. Occasionally, dischar; a male partner may draw attention to a symptomless infection in the female.

Approximately 20 per cent. of all patients complaining primarily of va; discharge are infected by the gonococcus. It may be added that infestation with *Trichomonas vaginalis* is nearly three times as common. It is almost redundan mention that careful interrogation and bacteriological investigation are esser for accurate diagnosis and control of the results of treatment. Much harm be done by jumping to conclusions; the terms "gonorrhœa" and "venereal disc: are best avoided in the patients' hearing until the diagnosis is beyond disp and even then it is better to avoid them, not from any reason or sense of indelic but in order to obviate any repercussions in the patients' social and dome relationships. The absence of bacteriological proof in women should not lea(a sense of false security. If in doubt, treat as gonorrhœa. Much less harm be done.

Details of clinical examination and the collection of material for laborat examination are purposely omitted, as they have been adequately described numerous occasions. Following the recommendation of the American Neisser Society, cultures should be taken as a routine to confirm the results of sm examination. It is my experience that positive cultures were only obtained wl positive smears had already been reported. The complement fixation test, be for syphilis and gonorrhœa, should be employed as a routine. Its value in syph

is beyond dispute, but in gonorrhœa it is far from reliable. A negative result should be disregarded if the clinical findings are suggestive, but a positive result is valuable corroborative evidence, particularly in chronic lesions.

TREATMENT

In *pre-sulphonamide days*, a patient under treatment for gonorrhœa was instructed to drink at least six pints of bland fluid daily, and was given an alkaline diuretic. Alcohol and sexual intercourse were strictly forbidden, and bromides were given by mouth to reduce the sex urge. There is a tendency, nowadays, to depend too much upon chemotherapy, and a plea should be made for the maintenance of the time-honoured measures detailed above. The copious fluid is an effective urethral wash-out, and reduces the risk of formation of sulphathiazole crystals in the urinary tract, whilst citrates reduce the nausea, inseparable from the sulphonamides. There is no doubt that avoidance of alcohol would reduce the spread of gonorrhœa. In addition to the general measures, local treatment was carried out, and consisted of daily vaginal irrigations with bicarbonate of soda solution, after which the upper vagina was loosely packed with gauze, soaked in sterile glycerin. Protargol, 10 per cent., was applied to the cervical canal and urethra. This treatment was carried out for a variable time, according to the response, the minimum period being two months.

These measures were laborious and time-consuming, and very irksome to the patient and her medical attendant. They also required the services of a nurse competent to carry out the treatment, and it was frequently economically impossible for the patient to attend regularly.

The advent of *chemotherapy* has produced great changes, indeed there has been a tendency for the pendulum to swing too far, and for gonorrhœa to be regarded as an innocuous condition adequately dealt with by means of a few tablets. Such complacency is regrettable, and it must be emphasized that, in spite of the remarkable progress made, gonorrhœa is till a potential source of considerable disability in women, particularly in view of its possible effect on future fertility.

The future is, however, full of promise, for penicillin has already been proved to be effective in the treatment of gonorrhœa which has proved resistant to sulphonamides.

DETAILED TREATMENT.—The patient is given instructions to drink six pints of bland fluid per day and to avoid alcohol. Intercourse is forbidden, and the danger of transmitting the infection to others, and to the patient's eyes, is stressed. *Sulphathiazole* is prescribed as follows:—

Initial dose of 2 gm.
Then 1 gm. four-hourly for forty-eight hours.
Then 1 gm. six-hourly, until a total of 30 gm. has been taken. A mixture containing 30 grains of potassium citrate per dose is ordered, three times a day.

Nausea and occasional vomiting are frequently observed but marked intolerance is uncommon. In such cases, the drug should be stopped and a white cell count carried out. If this is satisfactory, a 20 gramme course of sulphadiazine is started.

Salpingitis.—The incidence of acute salpingitis due to the gonococcus undoubtedly diminished during the last ten years. A certain number of c, however, are still encountered.

Diagnosis may be difficult, an acute appendicitis being the most com condition that requires exclusion in the interest of the patient. If the diagn can be made with confidence, then the treatment recommended is as follows:-

The patient is sat up in Fowler's position, antiphlogistine fomentations are applied to abdomen, and hot vaginal douches administered to alleviate pain. Sulphathiazole is g in full doses, as previously outlined, and morphine to relieve pain. Fluids can be g by mouth, unless there is vomiting, in which case an intravenous drip is set up. Glu in saline can be given up to a total of six pints in twenty-four hours, and soluble sul thiazole is given in the drip. Operation is indicated only when the diagnosis is in dis or if the general and local condition is deteriorating in spite of treatment. This us indicates the formation of an abscess, which should be drained, preferably by the abdom route.

Gonococcal arthritis is now rarely seen. It may involve one or more joints, knee, ankle and wrist being most commonly affected. The arthritis may be first and only obvious manifestation of a Neisserian infection. The affected j should be kept at rest and Scott's dressing applied as a local counter-irri My experience of treating such cases by means of chemotherapy is limited, the response appears to be satisfactory.

Gonococcal proctitis is occasionally encountered and may follow unnat practices, or it may be a contact infection from the pus escaping from the vag It is characterized by a purulent discharge from the anus with consider tenesmus. Treatment is by chemotherapy. Relief of local symptoms is obtai by rectal wash-outs of lead and opium lotion.

CONCLUSION

The gonococcus is still a dread enemy of society and an ever present sourc unhappiness and ill-health to the human race. The return of our victorious arn from overseas will, alas, carry with it possible repercussions which the vigi practitioner will do his best to minimize. It is to be hoped that penicillin will readily available so that the practitioner will be efficiently armed for an effec attack on this serious scourge.

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SOCIOLOGICAL ASPECTS OF
PSYCHONEUROSIS

By Flt. Lt. R. N. TRONCHIN-JAMES, M.R.C.S., L.R.C.P., R.A.F.V.R.

IT is frequently overlooked by medical practitioners, as well as by laymen, that neuroses are endemic, and the victims of the condition have (particularly in the past) had a stigma attached to them which could have been avoided if the condition had been diagnosed as a specific illness with typical etiology and amenable to skilled treatment. Two chief factors are involved in precipitating a breakdown: the emotional stability of the individual and the strains and stresses, both mental and physical, to which he is subjected. The strongest character will break down in sufficiently adverse circumstances, as for example a soldier who worked through the "blitz" in London on a bomb disposal squad and was a member of the party that removed the St. Paul's bomb; he carried on satisfactorily with this arduous work until his mother fell ill—an added strain with which he could not cope. In peace time many persons are treated for years with "medicines" for indefinite complaints; it is only necessary to consider the backaches of women and headaches and gastric disturbances of both sexes which are of importance in producing unhappiness and unemployment. In war time the importance of early recognition and specialized treatment is accentuated by the wastage of manpower; also the mass employment of people by the State, with subsequent pension claims in the event of illness, throws on the State the onus of diagnosing and treating neuroses and arriving at a prognosis for pension purposes. A stigma is often attached to neurosis because people fail to discriminate between it and conscious exploitation of symptoms—or malingering. This stigma is exaggerated in war time because neurotics, although they are often apparently healthy, are temporarily of no value to the community. Many persons through lack of insight tend to react emotionally to neurotics, as if they saw there the "evil that is in themselves," in the same way that some parents condemn inordinately in their children those manifestations that they have striven to subdue in themselves.

OBSERVATIONS AT A NEUROSIS CENTRE

The following observations are based on interviews with 350 consecutive male Service patients, mostly soldiers, admitted under one medical officer over a period of thirteen months (April 1943 to April 1944 inclusive) to an Emergency Medical Service Neurosis Centre. The subjects comprise a good cross-section of the community, excepting commissioned ranks, as the conscription net leaves out only the unfit, and includes men in the lowest medical categories and the Pioneer Corps. In a neurosis centre, interviews with patients present opportunities for obtaining detailed information about their lives, the accuracy of which can be checked by visits from, or communications with, relatives, ex-employers, Army authorities and social welfare workers. The last named will pay home visits and furnish full

and skilled reports in order to help the practitioner to obtain a clear picture c⸳ ⸳⸳
case. This information is required for diagnosis and treatment, but is also val⸳
for sociological purposes.

The psychiatrist can gain the confidence of his patient in a way that enable⸳
to obtain information that is not immediately relevant, and the patient ca
retained for a lengthy stay, if necessary, thus enabling the psychiatrist to make
contact 'and observe him under different conditions. In dealing with S⸳
patients it is an advantage to the civilian psychiatrist that he is not in uni⸳
as it avoids the suppressions that might result from his being a "senior offi
although he is in the patient's eyes a person of influence in military spheres, ⸳
enhances his position, as he is able to obtain special postings, transfers or disc⸳
from the Service. A psychiatrist views dispassionately perversions that some
arouse revulsion in a practitioner, and this encourages the patients to speak ⸳
about the problems that obtrude themselves into his life and dominate his n⸳
activity in a way that physical ailments do not. Emotional problems, as oppos
pathological entities, cannot be viewed objectively by the patient, since the⸳
symbiotic; this causes perplexity and helplessness in the attitude of the pa⸳
which helps the psychiatrist to obtain his confidence.

CLASSIFICATION OF CASES

The patients are divided into three groups:—(1) Anxiety; (2) hysteria; (3) ot⸳
Group 1 consists of anxiety states of all types, in which the patient doe⸳
manifest physical conversion symptoms. They include the patients sho⸳
obsessional symptoms, all of whom (with two exceptions, see group 3) manif⸳
this as a symptom in a typical anxiety state.

Group 2 consists of hysterics, i.e., patients who have resolved their emoti⸳
difficulties by unconsciously converting them into a physical symptom.

Group 3 is a mixed group, comprising psychoses (which would of nece⸳
be mild or incipient since they have been admitted to a neurosis centre), psy⸳
pathic personalities and obsessionals; the last group comprised two patients,
being the only symptom and crippling in its domination.

HISTORY OF CASES EXAMINED

To stress that these neurotics comprised a good cross-section of the commu⸳
information was obtained in particular on, and the types of illness correlated ⸳
the following points:—

(1) *Service record.*—A few examples (which are not exceptional) will show ⸳
these neurotics had performed duties demanding the highest morale, and ⸳
did not break down until their work was completed; often they resented t⸳
disability strongly as preventing them from carrying on their duties.

A man in the Maritime Anti-Aircraft had been torpedoed four times and mined o⸳
his longest time in a lifeboat was nineteen days and on one occasion he was alone on a ⸳
for seven days. A glider pilot was eleven days at sea in a rubber dinghy after being shot d⸳
over the Atlantic. A soldier on the Burma front who was hung upside down by the Japan⸳
was only rescued by a coincidental counter-attack by our men. Finally, a man who wa⸳
the famous Malta convoy of August 1942, being sunk twice, was picked up by the Itali⸳
escaped from the prisoner of war camp, and on returning to England found that his ⸳
had deserted him.

stresses such as war engenders. In treating neurosis at a centre in war time it is not possible to treat the basic emotional instability radically by psychoanalysis (nor are all patients suitable for this form of treatment); the best that can be done is to help the victim by giving him some insight into his condition and removing the trauma which has evoked the emotional reaction to the situation in the present. In dealing with Service patients their disposal gives an indication of the results of treatment, and in this respect it is important to know the subsequent career of those who were "cured," i.e., returned to their previous work. This was done by means of follow-ups sent to their units at three-monthly intervals. Follow-ups have been successful in 217 patients (62 per cent. of the total). Other patients were improved, i.e., could be returned to other duties or in a different medical category. Failures are considered as those who had to be discharged from the Services:—

		Returned to unit "Cured"	Lower medical category "Improved"	Discharged "Failure"
Anxiety	146	63 (43·8 per cent.)	26 (24 per cent.)	57 (32·2 per cent.)
Hysteria	160	101 (63·1 per cent.)	27 (16·9 per cent.)	32 (20 per cent.)
Others	44	—	—	44 (100 per cent.)
	350	164 (47 per cent.)	53 (15·1 per cent.)	133 (37·9 per cent.)

It is seen that 62·1 per cent. of the patients returned to their units; 89 per cent. of the follow-ups have been received on 137 of these patients who, after an average of six-and-a-half months, are performing full duties, efficiently and willingly: 11 per cent. were performing inefficient duties or had subsequently been discharged after an average of four-and-a-half months' further service.

SUMMARY AND CONCLUSIONS

Observations are made, based on 350 consecutive male non-commissioned Service patients admitted to an Emergency Medical Service Neurosis Centre under one medical officer.

The cases comprise a good cross-section of the community.

Differences between hysteria and anxiety states are noted.

The majority were amenable to treatment, but in a third group the patients, who were basically unstable, were all discharged the Service as being unsuitable.

Statistically the number is small, but the facilities for obtaining detailed information and checking were good.

It is seen that persons of the highest cultural, civic and commercial value are numbered among neurotics, as well as men of great physical courage.

An association of adverse circumstances—physical and mental—may result in a temporary breakdown in persons of high value to the community.

Neurosis is widespread in mild forms and a great deal of time, energy and money is wasted by practitioners and the relatives of neurotics by the omission to recognize neurosis as an illness requiring active and specific treatment.

THE RÔLE OF THE TONSILS AND ADENOID MASS IN THE PRODUCTION OF IMMUNITY IN CHILDHOOD

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THE medical profession as a whole is in agreement that after removal of tonsils and adenoids, when the operation has been adequately performed, the general health of some children is permanently improved, that in others the improvement is only temporary, and that in a third category no improvement in the symptoms for which operation was advised is obtained: it follows that some cases are selected for operation unnecessarily. The question therefore arises:—"Is it possible, by correlating what is known of the physiology of the tonsil with physical signs and symptoms usually considered as justifying its removal, to avoid unnecessary operations and select for this treatment only those cases in which permanent improvement is predictable?"

With this object in view, what is known of the physiology of the tonsil will be examined, and with this knowledge as a basis the usual reasons for which operation is advised will be reviewed, in the hope that a satisfactory answer to the question can be deduced.

PHYSIOLOGY

All tonsils, except those of the new-born child, contain living micro-organisms which have gained access from food or air. Some of these continue to live, others die, and their death is caused by the immune bodies which the child already possesses; he is not yet immune to those that live.

The living micro-organisms produce their toxin which is absorbed into the lymphoid system, where, by means of a biochemical reaction, antitoxins and anti bodies are formed. Some of these are sent back to the tonsil by its blood supply and here they destroy the living micro-organisms; the rest remain in the blood stream. In this way the infection is cured and immunity to it is increased. It may therefore be assumed that by acquiring and recovering from air- and food-borne infections, the number of which varies according to the child's innate immunity and his power of acquiring it, resistance to infection is gradually increased and the child becomes in time more or less immune to the infections which attack the community in which he lives.

The tonsil is therefore an organ the function of which is to pick up organisms from food or air and to grow those to which immunity is needed; it is the factory in which toxin is produced and from which it is absorbed as necessity demands.

The above remarks apply with equal force to the adenoid mass and to Peyer's patches, except that the latter deal mainly with food-borne, the former with air-borne, organisms. If what has been said is accepted as in the main a true description of the physiology of the external lymphoid masses, it is evident that they have

important work to do, especially in young children, for in them auto-immunization has only just begun, and many future infections are necessary before it is completed.

Thus permanent improvement cannot be expected if the tonsils and adenoids are removed while immunization is in progress, unless they harbour an organism to which further immunization is impossible. With this as the main guiding principle in selecting cases for operation, the usual reasons given for removal of tonsils and adenoids will now be considered.

TONSILS

The usual reasons are three in number:—

(1) Sore throats
(2) Sepsis
(3) Enlargement

(1) *Sore throats.*—As explained above, these are in many cases necessary for the production of immunity. Each time the child recovers it is evident that anti-bodies have been formed, and if he is in good health between the attacks it is fair to assume that auto-immunization is progressing satisfactorily. In such cases it is unlikely that tonsillectomy will be followed by permanently improved health.

(2) *Sepsis.*—This varies in degree, and it is impossible to assess its magnitude by inspection. Moreover, all tonsils contain micro-organisms, and in this sense all are septic. The presence of sepsis does not indicate that auto-immunization has ceased. A tonsil removed for this reason, without due consideration being given to its physiology, must in some cases lead to disappointing results.

(3) *Enlargement.*—All tonsils increase in size during an acute infection; some remain large for a longer or shorter period after the acute stage is over. It has been suggested that by their size they may in some cases interfere with swallowing and breathing, and should actual dysphagia or dyspnœa be caused in this way operation is perhaps advisable. But such cases are in fact extremely rare, and it is a common experience to see a healthy child with very large tonsils. It cannot be concluded that a bulky tonsil has ceased to function normally, and its removal for this reason cannot always result in permanent improvement in the child's health.

ADENOIDS

There are also three main conditions which are thought to justify removal of an adenoid mass:—

(1) Mouth breathing
(2) Recurrent colds
(3) Discharging ears

(1) *Mouth breathing.*—It is widely considered that nasal obstruction is usually caused by an adenoid mass large enough to obstruct the posterior nares, and for this reason its removal is frequently advised. When obstruction is caused in this manner the operation is perhaps justifiable. In several ways it can be shown that this attitude to nasal obstruction is often incorrect. If a child with this physical sign be examined at different periods during the day it is frequently discovered that at certain times nasal breathing is carried out normally. Since the adenoid mass does not fluctuate in size, it cannot in this case be the cause of the obstruction. Again,

at operation it is not uncommon to find that the adenoid mass is very small—too small in fact to be responsible for any obstruction to the nasal airway. In this case too, the adenoid mass cannot be blamed. Furthermore, many children suffering from recurrent nasal obstruction present a physical sign the implication of which is not always realized, i.e., a muco-purulent discharge from one or both nostrils. This discharge cannot be directly due to an adenoid mass, but is definite evidence of sinusitis which, if present, is easily confirmed by transillumination. Sinusitis is always accompanied by enlarged turbinals, which tend to fluctuate in size, sometimes blocking the airway, at others allowing free nasal breathing. Removal of an adenoid mass in this type of case, since it is not always or even usually responsible for the mouth breathing, is often followed by a disappointing result.

It is unfortunate that the term "adenoid facies" has been introduced, for it implies that the usual cause of mouth breathing is a large adenoid mass. It has been seen, however, that this is by no means always the case; in fact an adenoid mass large enough to block the airway is comparatively rare, whereas recurrent blocking due to enlarged turbinals, in its turn due to sinusitis, is extremely common. This catchword has led to many "lightning" diagnoses and irrational operations. To substitute "sinus facies" would suggest the pathology more correctly.

(2) *Recurrent colds.*—In the main these should be regarded as "stepping stones" in the acquisition of immunity, their number depending upon the child's power of acquiring it. The frequency with which they recur does not indicate that the adenoid mass has ceased to function, and its removal seldom, if ever, lessens their number. Moreover, it is in this type of case that sinusitis is usually the cause, and as in the majority of cases this can be treated successfully by small doses of potassium iodide, the removal of adenoids as a cure for recurrent colds is usually unnecessary.

(3) *Discharging ears.*—It is true that after removal of adenoids many ears cease to discharge. A critical survey of these cases reveals the fact that success is obtained mainly, and perhaps entirely, in subacute and recurrent cases, many, and perhaps all, of which would have recovered with local treatment. That operation fails in chronic cases is well exemplified by the fact that chronic aural discharge is frequently observed in children whose adenoids have been removed. A discharging ear does not show that further immunization is impossible and, since even when discharge ceases after operation it is uncertain whether success is *post* or *propter hoc*, it may be concluded that removal for this reason must swell the list of unnecessary operations.

SELECTION FOR OPERATION

From the above discussion it is clear that when tonsils are removed because of sore throats, enlargement or sepsis, some unnecessary operations will have been performed. Similarly, when adenoids are removed for nasal obstruction, recurrent colds or discharging ears, an important organ is sometimes sacrificed in vain.

The position is now sufficiently clear to attempt an answer to the opening question—"Is it possible to select for operation only those cases in which permanent improvement is predictable and in this way eliminate unnecessary operations?"

A decision on this point is not easy to make but the following suggestions would appear to be relevant.

It must always be remembered that the true function of the external lymphoid masses is, as explained above, to "manufacture" toxin and allow it to be absorbed as necessity demands, so that by auto-immunization the child's resistance to air- and food-borne infections may be gradually increased. The younger the child the more important is this physiological reaction, for upon it his future resistance to infection depends, and it may well be that, if the organs which are responsible are removed while auto-immunization is actively proceeding, an inadequately immunized individual will be produced. It is true that temporary improvement may be noted, for by operation an infection will have been removed, but it is by no means certain that this initial result will be permanent, for anti-bodies which the child needs will not be produced. Thus, in spite of sore throats, enlargement and sepsis it is well to be reluctant to advise operation (especially in young children), unless it is obvious that in the tonsil and adenoid mass an organism is present to which further immunizing action is impossible.

In young children, for example those under ten years, it is extremely difficult to be certain of this, for judging by the number of infections they acquire and recover from it would appear that in them auto-immunization is more necessary and more successful than in older children and adults. But if, when uncertain, the child is given the benefit of the doubt, many unnecessary and perhaps harmful operations will be avoided.

It has been pointed out above that removal of adenoids as a cure for recurrent colds and aural discharge is frequently followed by disappointing results. It has also been seen that nasal obstruction is more frequently caused by sinusitis than by a large adenoid mass. A careful clinical examination will nearly always point to the correct pathology, for if the obstruction is not permanent, and if nasal discharge and transillumination reveal the presence of sinusitis, the practitioner may be sure that this, and not adenoids, is the cause. All will agree that in this type of case operation is undesirable.

There are, however, several clinical conditions in which it can be said with some degree of certainty that an organism is present in the tonsils, to which immunity has failed or is failing:—

(1) *Tuberculous adenitis.*—If this has been present for six months or so and the mass is neither adherent nor decreasing in size, removal of tonsils will often cause the glands to disappear, without suppuration, especially if the child is ten years old or more.

(2) *Certain cases of rheumatic fever.*—Rheumatic fever frequently, and perhaps always, follows a specific tonsillitis; this tonsil is therefore the factory in which the toxin is produced. As a rule anti-bodies are formed which overcome the infection. Sometimes, however, the acute stage gradually becomes subacute, characterized by periodic rises of temperature and a cardiac lesion increasing in severity. It may be assumed that toxin is being produced in the factory, but anti-body formation is defective. Experience has proved that removal of tonsils and adenoids in this stage is followed by remarkable improvement.

(3) *Certain cases of nephritis.*—This condition is frequently also a sequel to

tonsillitis and usually clears up if anti-body formation is adequate. If, however, blood urea remains high, and blood and albumin do not disappear from the urine a reasonable time, it may be assumed, as in the case of subacute rheumatism, toxin is being produced but anti-body formation is failing. In this stage remov the "factory" is followed by rapid improvement, in the majority of cases.

(4) *Exophthalmic goitre.*—Under medical treatment some cases cease to impr In a proportion of these, examination of the throat discloses obvious tonsillar sep pointing to the fact that toxin is being produced without the ancillary anti-b formation. Removal of tonsils in such cases has been followed by rapid impr ment in the physical signs and symptoms.

It is conceivable that some chronic diseases of doubtful origin chiefly affect adults are primarily due to failing auto-immunization to some air- or food-bo organism. If so, it is justifiable to assume that in them toxin is being produ more or less normally in the appropriate lymphoid mass, but the anti-body fon tion which this toxin should induce is defective. Should the tonsil be the fact a careful examination will reveal obvious sepsis, often without either an incre in its size or a history of sore throats. If in such cases medical treatment has fai or is unlikely to be successful, removal of the tonsils is justified.

OPERATION

The operation for removal of tonsils is not an easy one; cases in which ι ·ι has been incomplete, and others in which extensive scarring has occurred, frequently seen. For several reasons it would appear that a careful dissectior preferable to a guillotine operation.

A tonsil which requires removal is usually adherent, either to the faucial pill or to the tonsillar bed. Blood vessels are often concealed in the adhesions. Inj to these and to the pillars can usually be avoided during a dissection.

On the other hand, with the guillotine, when adhesions are present, a cert amount of force is required to evert the tonsil into the ring of the instrume leading to one or other pillar being included within its grasp. When the blad driven home portions of the pillars are inevitably removed with the tonsil, sub quently causing undue scarring. Moreover, blood vessels are not seen and may divided at some distance from the tonsil, with consequent excessive hæmorrhaç For these reasons many experienced surgeons have entirely given up using t guillotine.

SUMMARY

(1) The physiology of the external lymphoid masses have been discussed.

(2) With this as a guiding principle it has been shown that many of the oper tions for removal of tonsils and adenoids, which are performed at the present tir are performed unnecessarily.

(3) It is pointed out that operation in young children is more harmful than older children and adults.

(4) It is maintained that nasal obstruction is more commonly caused by sinusit than by an adenoid mass.

(5) It is suggested that removal of tonsils is indicated in several chronic adu diseases.

(6) Choice of operation is discussed.

ORGANIZATION IN GENERAL PRACTICE

By JAMES F. O'GRADY, M.B., Ch.B., T.D., Colonel (late R.A.M.C., T.A.)
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IT is hoped that this short article may be of some slight assistance to any medical men and women who are about to take up general practice, and who have had little or no experience of the clerical side. In an average practice the amount of clerical work is considerable, and it is well worth while to organize this properly.

In the course of the article reference is made, periodically, to the dispenser. It is strongly recommended to medical men and women, who are starting in practice, that they employ a qualified dispenser, and to regard the expenditure incurred as a sound investment. Employ one who holds a legal dispensing qualification, in order that she (or he) may be able to handle the prescriptions containing "dangerous drugs" and maintain the Dangerous Drugs Register. Apart from saving the practitioner the time involved in dispensing and sending out accounts, a good dispenser can be an asset to the practice in many ways. For example, there are occasions on which a practitioner is unavoidably prevented from being present at his surgery (e.g., being engaged on an urgent confinement). On such occasions the dispenser will be able to issue the repeat medicines, will be able to explain the practitioner's absence, and will, in most cases, prevent the patients from going away disgruntled.

BOOK KEEPING

There are many ways of "keeping the books" in a practice, the more common methods being by means of:—(a) Ordinary bound ledgers; (b) loose-leaf ledgers; (c) card index system. From experience of all three methods it is clear that the

Fig. 1

card index system is much more satisfactory than either of the other method
A most convenient sized card, neither too large nor too small, is 8 by 5 inche
The cards are supplied by Messrs. Kenrick & Jefferson, of Manchester, but simil
ones are manufactured by other reputable firms of stationers.   The front of tl
card is shown in fig. 1.

Note that this is a standard printed card. If it were specially printed the la
two columns should be equally spaced.

A word of warning. Do not be tempted to use cards on which the twelve month
January to December, are printed in the left-hand column. They are not sati
factory, as it is possible for a card of this type to contain only two or three entri
during the year and then be finished. It is a great waste of card space and, of cours
storage space. The back of the card (fig. 2) has been ruled to special requiremen
by Messrs. Kenrick & Jefferson, and, from practical experience, it can be state
that the spacing is just right.

FIG. 2

The four narrow columns are 4/10 of an inch wide, and are used for the yea
and date ; the four wider columns are 16/10 of an inch wide and are used fc
clinical notes and prescriptions.

The method of using the cards is as follows:—

When a new patient comes for consultation, a blank card is taken and the followin
particulars are entered on the front:—Surname, Christian name of husband (this informatio
being required, legally, in the unfortunate event of having to sue for payment of the account]
address, and telephone number of patient's home and office. The last information i
surprisingly useful, especially during the present telephone directory difficulties. The can
is then turned over, the date is entered and brief clinical details are put down..

On the occasion of the patient's first visit the age should be entered in brackets
It is unnecessary then to ask the age on subsequent visits.

Most practitioners have their own pet method of abbreviating and there is

ore no point in discussing this now; it is, however, useful to have some clear method of abbreviation.

When the patient has retired to the waiting-room to wait for medicine, turn the card over again, insert the year and month in the left-hand column and, under the appropriate day of the month, enter the *amount of the fee* to be charged for the service just rendered. Doing this at once saves an enormous amount of time at the end of the month or quarter, or whenever the accounts are sent out. (The amount of the fee for any visits is entered in a similar way.) If the patient pays a cash for the consultation, the amount is entered on the front of the card, in the appropriate month-day space *in red ink*. All entries in red, on the front of the card, indicate payments.

The card is now handed to the dispenser, who dispenses the medicine, and the card is replaced by her in the card drawer.

There is nothing further to be done with the card until either the patient's next visit or the time comes to send out the account.

The sequence of events just detailed takes much longer to describe than to carry out, and it is worth noting that, in terms of "books," the following equivalent book entries have been completed on the card:—Day book, Prescription book, Cash book, and Ledger.

One card is maintained per family, except in cases in which any individual member of a family prefers to have his or her own account. When the time comes to send out the accounts, the total for the quarter, or other period, is entered in the first cash column, underlined (to indicate that the account has been sent to the patient), and the date of posting the account is entered in the last column but one. When the account is paid the amount is entered in red ink in the second cash column and the date of payment entered (also in red ink) in the last column. If the account is paid by instalments, these are entered in a similar manner. In order to illustrate the working of the system, fig. 3 and 4 show the front and back of the completed card of an imaginary family.

Disposal of cards.—Three drawers, trays, or other suitable receptacles, are maintained for the cards, as follows:—(*a*) Cards in use at present; (*b*) cards temporarily not in use; (*c*) cards permanently out of use.

(*a*) These are the cards belonging to patients who have attended during the current financial (income tax) year. As soon as possible after the end of the financial year, the cards are audited by a chartered accountant, and then transferred to drawer (*b*). Cards of patients who are still attending during the new financial year are, of course, retained in drawer (*a*).

(*b*) These cards, as mentioned above, belong to patients who have not attended during the present financial year, but there is still room on the cards for further entries. These cards will not be required until the patient's next attendance, which may be months or years later. The advantage of maintaining this section of cards is that it prevents the "live drawer" (section *a*) from becoming unnecessarily bulky.

(*c*) Cards on which there is no further room for entries are placed in drawer (*c*), as soon as they have been audited. They are finished with and are retained simply for future reference, if necessary.

Name JOHNSON. JAMES.

Address 21. MOUNT ST. BLACKTOWN.

TEL: HOME. BLA.12.
OFFICE. CEN.56.

N°	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31					
1943																																				
Dec.																				7/6													7/6			
1944																																				
Jan	5/-																																5/-			
Mar	7/6	3/6	3/6																														14/6		7/9/44	
																																	15/-		10/4/

FIG. 3

1943
Dec. 27 — Mrs (40). Back-
ache. Frequency.
B.P. 140/80
urine NAD : B.O.
Cystitis.
mist Buchu.

1944
Jan 3 Better Rep mist.
Mar 1 Phyllis (10)
Abscess neck.
Incise.
2. Dress.
3 Dress (No fee)
4 O.K. now.

FIG. 4

SURGERIES BY APPOINTMENT

hen I returned to general practice after being invalided out of the Army, I found
it, owing to there being so many general practitioners away on active service,
se left at home were having to deal with enormous crowds during surgery hours,
l it was nothing unusual to have a waiting-room packed to the door, with a
:ue waiting outside. One reason for this was that the normal surgery hours were,
necessity, quite inadequate for the large numbers attending, and the patients
mselves felt that if they did not get into the waiting-room before "closing time"
y would not be seen. In order therefore to save the patients from a prolonged
t in a crowded waiting-room, all my patients are now seen by appointment.

Notwithstanding the fact that this is largely an industrial district, the system
vorking extremely well, and is greatly appreciated by the patients. There are
er more than three or four patients in the waiting-room at one time.
identally, this plan enables the practitioner to regulate and level up the
:ndances on the different days. It is, of course, unnecessary to remark that no
:erentiation is made between panel and private patients.

The method of working the system is as follows:—An ordinary "University"
e of loose-leaf book, using sheets about $9\frac{1}{2} \times 7\frac{1}{2}$ inches, is used as the appoint-
nt book. The sheets are printed as shown in fig. 5, each side of each sheet being

	Monday, Jan. 3.		Tuesday, Jan. 4.	
0	5.0	2.0	5.0	
5	5	5	5	
10	10	10	10	
15	15	15	15	
20	20	20	20	
25	25	25	25	
30	30	30	30	

'o save space the top only of the "page" is here shown. The numbered five-minute intervals
down each column for a total of three hours.

FIG. 5

'oted to two days. The day of the week and the date, for example, "Monday,
.g. 28," are entered in the top space, and the sheets are prepared for a period of
least one month ahead.

The space immediately above the surgery hours is used for special appoint-
:nts, e.g., visits to hospital, consultations with specialists, social engagements.
Practitioners who run more than two surgeries a day should modify the printing
cording to their own particular requirements.

Although the surgery hours are, nominally, 2 p.m. to 3 p.m. and 6 p.m. to 7 p.m., these times are usually inadequate, especially in the winter, and it is an advantage to have the five minute times printed for the whole period 2 p.m. to 8 p.m. This makes it possible to regulate the afternoon and evening appointments to suit the demand.

In booking the appointments, a rough estimate is made of the amount of time which the patient will require, e.g., patients known to be coming merely for a repeat prescription and a certificate may be booked in at the rate of two, or even three, per five minutes, whereas the patient who will require a detailed examination may be allotted five or ten minutes or more, according to the circumstances of the case.

The problem of "casuals" who arrive at the surgery without an appointment presents no difficulty. A notice in the waiting-room instructs them to knock on the dispenser's door and ask for an appointment. The dispenser then gives them the first available "time." This, perhaps, may not be for an hour or so, but the patient then has the opportunity of going for a walk or doing some shopping, and returning at the appointed time. They do not have to wait their "turn" in the waiting-room. Accident cases are, of course, seen at once.

DAILY VISITING LIST

The list of patients to be visited, which is taken in the car on the visiting round, is well worth a little trouble in its preparation, and for this purpose a sheet of foolscap is used, ruled as shown in fig. 6.

This part left blank for clip						
Date........................						
Order of visits	Name	Next visit	Name and age	Medicines	Charge for visit	Remarks

FIG. 6

This is fastened, by means of a spring letter-clip at the top to a foolscap size sheet of millboard, which acts as a base on which to write.

Before starting on the round, the names of patients to be visited are entered in the second column (either by the practitioner or the dispenser), and the order in which the visits will be made is entered in the first column.

On entering the car, after leaving the patient's house, complete the particulars in the sheet, viz.:—

Name and age. Usually entered only in the case of a first visit.
Medicines to be dispensed.
Charge for visit. (O.F. indicates ordinary visiting fee.)
Remarks.

On returning home, the sheet is given to the dispenser, who is then able to enter up every required detail on the front and back of the patient's record card, whether it be private or panel. It takes about ten to twenty seconds to write up the details on the sheet after making each visit. The time is well spent and saves a great deal of the thought and worry which are required if these details have to be recollected at the end of the round. Fig. 7 illustrates the method of using the visiting list, and shows the completed details for the first half-dozen of a round of visits.

This part left blank for clip						
Monday, June 19						
Order of visits	Name	Next visit	Name and age	Medicines	Charge for visit	Remarks
2	Brown	Wed.	Mary (8)	Rhei c̄ Soda	O.F.	Measles
4	Jones	Tues.	John Wm.	Prescn. given	Panel	Tonsillitis
1	Smith	Fri.	Mrs.		21s.	Inj. varix
6	Davies	Tues.	Tom (12)	Mist. Expect	O.F.	Bronchitis
3	Ellis	Fin.	Betty		Panel	Sprained ankle
5	Bailey	Fin.	Tommy (8)		O.F.	Chicken-pox

FIG. 7

SUMMARY

Time spent on the organization of the administrative side of general practice is well worth while, and actually saves time.

The card index system, as detailed above, does away with multiple books, and greatly simplifies the keeping of accounts.

Surgeries by appointment have proved a boon to patients, especially in the case of young children, reducing to a minimum the risk of infection in waiting-rooms, and enabling the practitioner to regulate his hours.

CHILD HEALTH

XI.—CARE OF THE NEW-BORN BABY

By C. ELAINE FIELD, M.D., M.R.C.P.

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"Whatever Splendour the actual Treatment of Diseases may reflect on the Science of Medicine it, by no means, comprehends the whole of its Province: for Prevention being in every case preferable to Remedies, the Medical Art would be more imperfect than other Sciences, were it devoted only to the latter."

Michael Underwood, 1805.

WITH these words Underwood prefaces his treatise on the management of the nursery, and to-day there is no sphere of medicine in which prophylaxis is more important than in the care of the newborn. It starts in the antenatal period from the moment the mother realizes that she is pregnant.

ANTENATAL

Apart from the importance of careful routine antenatal examinations, advice to the mother on preparation for her expected infant is necessary to ensure a satisfactory rearing of the child.

The mother's diet should include an adequate intake of milk—at least 1½ pints a day—with addition of iron and vitamins A, B, C and D, when any deficiency in the mother is suspected, such as may occur during the winter months. In view of dietary restrictions in war time, the Government has made provision for extra milk, meat and eggs, as well as for additions of vitamins A and D and orange juice, for expectant mothers. However, of first importance is a good mixed and variable diet, including plenty of green vegetables and fresh fruit and no food in excess, and, even in war time, the nearest approach to this ideal should be attempted. Alcohol and smoking in moderation appear to do no harm.

Advice on the *preparation of the nursery* should include adequate ventilation, with windows that open, heating appliances and sufficient daylight. It is often advisable to arrange for the baby to live in the same room as the mother in the first two weeks, so that she can watch and learn its management. Particularly is this important in hospitals where nurses have insufficient time to spend on the mother-infant relationship. For this reason, also, support should be given to the post-war construction of maternity homes with cubicles for mother and baby, thus abolishing the nurseries for the newborn, with all their attendant dangers of cross-infection. The infant's clothes should be ready before birth, as well as a plain washable cot with coverings. No pillow is required, and is, in fact, contraindicated, in view of the real danger of suffocation, particularly in a feeble infant.

Plenty of time should be spent discussing the arrangements with the mother and answering her questions. As the busy practitioner has little time for this, it can best be done at Mothercraft Clinics in the neighbourhood, run by infant welfare personnel or health visitors, where the mother can bring her knitting—and other children if necessary—and be given a cup of tea before returning home.

For the satisfactory establishment of lactation, arrangements for a nurse or home-help to be present in the home during and after delivery, until the mother is up and about her daily duties and satisfactorily feeding her infant, are of the utmost importance. Particularly is this so in the case of the mother who returns home from hospital after her confinement, when a sudden change to housework causes a reduction in the quantity of breast milk and sets up a vicious circle of crying baby, anxious mother and so further reduction of the milk supply.

Care of the nipples.—Thorough washing of the breasts and nipples with soap and water, using a flannel, night and morning throughout pregnancy, is all that is necessary. Scrubbing is not recommended, but if the nipples are retracted, the mother should attempt to pull them out after each wash.

NATAL

After wiping the eyes and tying the cord, mucus is extracted from the back of the throat and the child is placed in a warmed cot. After an hour, if the condition is satisfactory, the baby may be washed, the cord dressed, a drop of 1 per cent. silver nitrate instilled into each eye and excess gently wiped away with a swab soaked in saline. Then the infant is weighed and returned to a warmed cot.

The establishment of respiration.—Sometimes there is difficulty in establishing respiration. This may be due to blockage of the air passages by mucus, and can usually be remedied by inversion of the child head downwards and repeated aspiration with a mucus extractor. But, not uncommonly, failure of respiration follows a state of cerebral concussion and shock in the newborn, the result of intracranial damage during too rapid a delivery, particularly in the premature infant, or the incorrect application of forceps. Sometimes respiratory failure may follow a state of cerebral asphyxia occurring in prolonged labour. At birth the child is pale, limp and fails to breathe, the circulation may or may not be depressed. These infants must be treated with care. After tying the cord and wiping the eyes, the infant should be placed flat in a warmed cot, mucus repeatedly extracted from the throat, and 0·003 gm. of lobeline injected into the umbilical vein. If there is no sign of breathing, oxygen with 5 per cent. carbon dioxide should be administered through a nasal catheter, and gentle manual compression and relaxation of the chest, at the rate of 40 compressions a minute, should be carried out under the cot covers. It is doubtful if intratracheal catheterization, for the purpose of sucking out mucus or applying positive pressure to the lung, is justifiable, except in experienced hands. Mouth to mouth insufflation is deprecated. The shocked infant tends to suffer from over-manipulation and exposure, which are undesirable.

Once fairly regular breathing is established, artificial respiration should be stopped and the child left quiet in the cot for at least six hours. As signs of cerebral irritation are often maximal on the third day, a depressant, such as chloral hydrate, 1 grain every four to six hours, is advisable for the first few days, and some advocate giving the baby vitamin K (2·5 mgm. by mouth on the first day) to prevent further intracranial haemorrhage. If the mother is suffering from toxaemia of pregnancy or has had an ante-partum haemorrhage, or if the delivery of a premature infant is expected, vitamin K, 5 mgm., given intramuscularly to the mother within four hours of delivery, may prevent haemorrhage in the baby. Lumbar or cisternal

puncture rarely relieves the symptoms but instead produces an unnecessary disturbance. These "cerebral" infants should receive the minimum of manipulation and be fed in the cot until most of the signs of irritation have subsided. These include drowsiness, irritability, flaccidity or spasticity of the limbs, a high-pitched cry, vomiting, and sometimes a bulging fontanelle.

POSTNATAL

FEEDING.—Few will contest the statement that breast feeding is best for both mother and baby and there are seldom any contraindications to its use. Open tuberculosis in the mother necessitates complete separation from her child, who therefore has to be fed artificially. Any severe illness in the mother, as well as bilateral breast abscesses, may necessitate temporary cessation of breast feeding, but in these cases it is frequently possible to re-establish the feeding later. Absolute failure of breast milk is a rare phenomenon.

Times of feeding.—The greatest stimulus for the formation of breast milk is the suckling of the infant at the breast, so that if the condition of both mother and child is satisfactory, the baby may be put to the breast for one minute each side soon after delivery. Not only is this an early stimulus to the breasts but in many cases it gives satisfaction to the mother, who can then have at least six hours' sleep before being disturbed again. Feeding for two minutes at each breast every six hours is then recommended for two or three feeds, followed by four-hourly feeds for the next twenty-four hours, then three-hourly until breast feeding is fully established. In hospital confinements this means continuing until the mother is back in her home and taking up her routine housework, a state rarely reached until the third or fourth week. An insufficiency of breast milk is more common than too much, and, although breast feeding may be fully established at ten days, directly the mother starts to get up, and particularly when she returns home to the daily duties and sudden added responsibility of her baby, her milk supply begins to fail. This is *the most important period in lactation*, when it is safer for the mother to be feeding every three hours until she has acclimatized herself to her new surroundings and duties; then, if she has sufficient milk, four-hourly feeding may be started. Mothers who have had several children and have fed the previous ones satisfactorily can, however, feed every four hours from the second day.

Little milk is obtained in the first three or four days and some like to give small quantities (up to three ounces a day) of boiled water, or *half-strength Liquor Ringer-lactatis (Hartmann's solution)** to prevent excessive dehydration. The latter tends to make the infant thirsty and therefore improves sucking. Any additions to breast feeding should be given from a spoon and not a bottle, and preferably not sweetened, as preference for the breast must be maintained. By the seventh day the baby may be left at the breast for the full time of ten minutes each side and the total requirement of $2\frac{1}{2}$ ounces of milk per pound of body weight per day should be obtained, and so far as possible estimates should be made for expected average weight, except when there is a large discrepancy.

Baby may be weighed once a day, on reliable weight scales, at a fixed time before a feed and, if satisfactory, test feeds are unnecessary unless an abnormal milk

* 4th Supplement to B.P.C., 1934.

supply is suspended. The normal infant loses approximately an ounce a day for the first four or five days, but regains this loss usually by the tenth day. After this, average gain of six to seven ounces a week for the first two months is usual.

Underfeeding.—The baby fails to gain satisfactorily and cries one or two hours *after* feeds, being ravenous at feed times. There is rarely any vomiting and the child is often constipated, but may produce the frequent small, dark-green, hunger stool.

Overfeeding produces a rapid gain in weight at first, then, as vomiting after the feeds and diarrhœa set in, the baby becomes dehydrated and loses weight. Crying after the feeds from abdominal discomfort or colic is the rule.

Test feed should be done to confirm any suspicions. The baby is weighed before and after a feed, taking care to make no change in between of clothing or napkins. The gain in weight is the quantity of milk taken. This test should be done for each feed extending over twenty-four hours, and preferably not repeated for another week, otherwise the mother tends to become over-anxious before each test feed, which is detrimental to the flow of her milk. If the mother has no scales, test feeds can usually be arranged at an infant welfare centre. These test feeds should include at least three of the feeds in the day, estimating a little more than average for the 6 a.m. feed and about average for the 10 p.m. feed at night.

To correct underfeeding.—Every effort should be made to restore the mother's milk supply to normal. She should have adequate rest and fluid intake, drinking a glass of water before each feed and two pints of milk a day. Feeding should be at three-hourly intervals (six feeds a day), ten minutes at each breast; then the mother should be taught to express manually any milk that remains in the breast and give this to the child. Manual expression of the breasts should be gentle and of short duration, otherwise bruising and possibly abscess formation may result. Alternate hot and cold spongings to the breasts immediately before the feed, with gentle massage, is often beneficial. If it is still necessary to complement, make up to the required amount (2½ ounces per pound body weight per day) with a humanized or half-cream dried milk, as this is the safest from infection. It may not be necessary to complement all feeds. After the twenty-four-hour test feeds, assess *approximately* the extra amount required at each feed; make the quantities as simple as possible for the mother and tend to underfeed rather than overfeed, so that baby is always hungry for the breast. After a week the twenty-four-hour test feed should be repeated and the feeds re-adjusted.

Supplementary feeding—replacing the whole of one breast feed by a bottle feed—should never be instituted unless the mother has to go out to work, as the greatest stimulus for more breast milk is the suckling infant, which in supplementary feeding is withdrawn for a whole feed. Injections of prolactin, or the many proprietary preparations advocated to increase the mother's milk supply, have not been proved sufficiently efficacious to recommend their general use.

To correct overfeeding, four-hourly feeds, using alternate breasts at each feed, are recommended, and these should last for fifteen minutes only. If the infant is greedy, give half an ounce of boiled water before each feed. *Never* try to dry up the breast milk; it is a difficult thing to control and may disappear suddenly and fail to return, and for this reason strong purgatives to the mother should   avoided

and her fluid intake should not be reduced below 3 pints a day. Increasing the daily exercise is a safer method.

VOMITING.—Small regurgitations of milk, often described as posseting, are common in the early months of life and are no cause for anxiety, provided the child is gaining satisfactorily. It is, however, advisable to exclude air-swallowing, which is liable to occur when the flow of milk is insufficient. On the breast this must be tested for, as already described, but if suspected in bottle feeding the rate of flow can be examined by inverting the bottle, when the milk should flow out at the rate of one drop a second. The baby may have further difficulty in obtaining the milk if inadequate provision is made for relieving the vacuum produced in the bottle during sucking. The vacuum will collapse the teat—particularly if this is of soft rubber—and no milk can be obtained. In a boat-shaped bottle this can be remedied by enlarging the hole in the rubber valve at the other end, but in a Soxhlet bottle it may be necessary periodically to lift the edge of the teat from the bottle, so allowing air to enter.

The most common cause of persistent vomiting in the first week or ten days of life is probably of cerebral origin and, when coupled with other signs of intracranial irritation or depression (as previously described), should be treated with chloral hydrate, 1 grain every four to six hours, until the child is a little drowsy, then slowly reduce the dose. Small frequent feeds are tolerated best, and, in the severe cases, two-hourly feeds may be necessary day and night to ensure sufficient intake of fluid.

Vomiting beginning in the second or third week, increasing in severity, particularly if projectile, is suggestive of pyloric obstruction.

THE STOOLS.—After the first few days the stools change their colour from dark-green meconium to a canary-yellow shade, of porridgy consistency with an acrid smell. Normally two or three are passed in the day, but one a day, or even one every other day, may be normal, provided the child is otherwise healthy. Bottle-fed babies produce a paler, more pasty motion and tend to be constipated. Loose green motions may be a sign of underfeeding, or if watery may be the onset of an infective diarrhœa, and treatment should be instituted at once. When constipation is producing abdominal discomfort, or a hard motion, liquid paraffin, one teaspoonful once or twice a day, should be given regularly for a few weeks and supplemented with milk of magnesia, one to two teaspoonfuls at night, when necessary. Strong aperients should be avoided, resistant cases being treated with periodic olive-oil enemas.

Excoriation of the buttocks rarely occurs in breast-fed babies, but artificial foods, particularly high carbohydrate foods, may produce frequent, frothing, acid stools, resulting in sore buttocks. Any correction necessary in the feeding should be made, napkins changed immediately they are dirty, and the area gently washed with soap and water and dried thoroughly. If the area is moist, simple exposure to warmed air is often efficacious, or the application of gentian violet and dusting powder when the child is in the "pram."

FRESH AIR AND EXERCISE.—The nursery windows should be kept open and the infant screened from any draughts. After the tenth day, baby should be put in the "pram" in the open air for two or more hours a day. Sunshine is good, provided it is shaded from the head and eyes.

For a short time each day, preferably just before the evening bath, the baby should be placed in a warmed room with only a loose vest on and permitted to kick and exercise the limbs.

NECESSITY FOR STERILITY

Infants are *very* susceptible to infections, particularly staphylococcal skin infections, so that scrupulous cleanliness must be practised throughout. The hands should be washed every time before handling the baby and after changing the napkins, and masks should be worn by all. It is unlikely that father, or even mother, will take to this kindly in the home, but its importance should be stressed for anyone coming into contact with the child who has a naso-pharyngeal infection. The baby should have all its own utensils and clothes, and bottles and teats should be thoroughly washed in soapy water and rinsed in running water immediately after each feed and boiled for two minutes before each feed. When the latter is impracticable they should be boiled at least once a day, and at the other times thoroughly washed out with running water after each feed and before the next, and kept covered up between feeds.

The mother's nipples should be sponged with warm water before and after each feed and then covered with a piece of sterile lint under the brassière. (Sterile lint might be supplied in squares for this purpose.)

GENERAL ADVICE

Instructions to mother must be simple, clear, and if possible written down on paper. She is usually highly strung and emotional after a confinement and liable to dissolve into tears at the slightest provocation. Middlemore (1941) explains in detail her mental outlook, and particularly its relationship to the child. A suitable nurse or home-help in the first month will give valuable moral support to the mother as well as helping in the home. If no help can be obtained, every effort must be made to persuade the mother to neglect the house for the baby for the first few weeks. A planned timetable for the day is often helpful and should include fixed periods for rest. Furthermore, it should be remembered that too many instructions may produce such an anxious state in the mother that her milk supply begins to fail, so causing further anxiety.

Instructions to father.—Advice and instruction to the mother in the antenatal period has been discussed, but of almost equal importance is the education of the father in the handling of infants, as they can cause considerable upsets in the home if they disagree with the mother's methods. Fathercraft classes are likely to be unpopular, but much good work could be done on the cinema or over the radio. However, if the practitioner could arrange some of his visits when father is at home, a timely chat might be of considerable assistance.

CONCLUSION

A tired, overworked practitioner must often be tempted to say, as the easiest and quickest way out of a difficult breast-feeding case, "put the baby on the bottle." It is hoped, however, that this article may stimulate him to persevere a little longer, when his just reward will be a contribution to a healthier, happier nation.

References

Middlemore, M. P. (1941): "The Nursing Couple," London.
Underwood, M. (1805): "A Treatise on the Diseases of Children," London.

NOTES AND QUERIES

DESOXYCORTICOSTERONE AND SODIUM RETENTION

QUESTION (from a subscriber in Wales).—I am treating a case of Addison's disease with bi-weekly intramuscular injections of percorten (D.C.A.), 10 mgm. per c.cm., combined with 10 gm. sodium chloride daily by mouth. Is there any danger of over-retention of sodium ions and excessive excretion of potassium ions with resultant cardiac impairment, or, alternatively, is there any indication for reduction of sodium intake and increase in potassium?

REPLY.—Desoxycorticosterone acetate causes retention of sodium, and this may lead to an accumulation of extracellular fluid, and even to congestive heart failure. It may also cause a deficiency of potassium ions, and consequent muscular weakness. These accidents only occur with overdosage. McGavack (1942) showed that patients in good clinical condition had a reciprocal relationship between sodium intake and D.C.A. dosage. If more than 9 gm. of sodium are given with a correspondingly low D.C.A. dose, the condition is less good than with less sodium and more D.C.A. On the other hand, if sodium is restricted to less than 1·5 gm., and the D.C.A. correspondingly increased, the results are again less good. The formula of the curve was found to be:—

$$\text{Na (gm.)} = \frac{K}{\text{D.C.A. (mgm.)}}$$

The value of K lies between 37·5 and 45 in 71 per cent. of patients, and between 30 and 55 in all. Therefore with the given D.C.A. dose of 2·85 mgm. daily the intake of sodium should lie between $\frac{37\cdot5}{2\cdot85}$ and $\frac{45}{2\cdot85}$ or between 13·1 and 15·8 gm. daily. This represents about 32 to 41 gm. of sodium chloride daily—three or four times the dose given in the example. There is therefore no danger of over-retention of sodium ions. It is indeed probable that the patient would do better if given more salt, provided he can stomach it. Alternatively, the dose of D.C.A. can be increased, following the formula, to about 10 mgm. daily (outside limits of $\frac{30}{4}$ and $\frac{55}{4}$; inner limits $\frac{37\cdot5}{4}$ and $\frac{45}{4}$, 4 being approximately the amount of sodium in 10 gm. of sodium chloride). In practice, it is unnecessary to worry about the potassium intake.

RAYMOND GREENE, D.M., M.R.C.P.

Reference

McGavack, T. H. (1942): J. lab. clin. Med., 27, 1117.

THE TOXICITY OF PRESERVATIV IN ANÆSTHETIC SOLUTIONS

QUESTION.—I find that certain solutions of l anæsthetics, such as procaine, contain 2 per c of chlorocresol as a preservative. As maximum amount of such anæsthetics that r be used is 500 c.cm., and it is quite comr to use 200 to 300 c.cm. at a time, I am anxi to know if the injection of this relatively la amount of the preservative (e.g., 5 c.cm 250 c.cm. of the anæsthetic solution is injec has any deleterious effect, either local or temic, upon the patient.

REPLY (from an anæsthetist).—Preservati such as chlorocresol are added to stock soluti of local anæsthetics from which it is inten to use one or two c.cm. at a time for mi operations. The toxicity of chlorocresol about the same as phenol and the quan (2 per cent.) in a solution of 1 or 2 c.cm harmless. When extensive infiltration is c templated, however, there is no justification any risk entailed in using anæsthetic soluti containing preservatives of any kind. In s circumstances the local anæsthetic solut should always be freshly prepared, in wh event the addition of preservatives is unnec sary. The preparation of fresh sterile soluti for local anæsthesia is not difficult. Procaine, example, is obtainable in solid form in ampou of 1 gm. already sterilized. It is an easy mat to dissolve the contents of the ampoule in required amount of sterile normal saline.

THE ETIOLOGY AND TREATMENT (TORSION SPASM

QUESTION (from a subscriber in Rhodesia). Are there any recent advances in the treatme and views on the etiology of torsion spasr I have a case under my care, in a young Hebr lad aged sixteen, with fairly sudden onset tv years ago, but no history of encephal lethargica. Would prostigmin be of any value?

REPLY.—Torsion spasm is a distressing mot disturbance involving the basal ganglia of tl brain. In its familial form, cases are observe most commonly amongst Jews. There is r recent advance in the drug treatment of tl condition. Sedatives may be useful and dru of the belladonna group are worth a tria Prostigmin is likely to aggravate the conditior In severe cases, attempts are sometimes made t relieve the condition by dividing motor tracts u the spinal cord or brain, but these destructiv operations may cause severe paralysis and ar obviously to be avoided if possible.

W. RITCHIE RUSSELL, M.D., F.R.C.P.

PRACTICAL NOTES

THEOPHYLLINE ETHYLENEDIAMINE FOR THE RELIEF OF BILIARY COLIC

SINCE it was appreciated by the clinician that morphine increases smooth muscle spasm, there has been an increasing tendency to use other drugs for the relief of biliary colic. The antispasmodic action of theophylline and its derivatives led A. Gladstone and L. Goodman (*Journal of the American Medical Association*, December 23, 1944, **126**, 1084) to investigate the action of theophylline ethylenediamine in biliary colic. In eight cases investigated, the drug, in doses of 0·25 to 0·5 gm. intravenously, gave prompt relief. In most cases the relief was obtained within ten minutes, but in some the pain had been relieved before the injection was completed. Only transitory side-effects were observed, such as transient nausea, fullness in the head, a sensation of warmth, or palpitations. It is recommended that the drug should be given slowly and well diluted. In severe cases, when complete relief of pain is not obtained after an initial injection, a subsequent injection (preferably of 0·25 gm.) may be given three hours later. Another use of this drug in biliary disease is in obtaining specimens of bile by means of duodenal intubation when other measures are ineffective.

THE APPENDIX MASS

AN analysis by A. G. McPherson and J. B. Kinmonth (*British Journal of Surgery*, January 1945, 32, 365) of 730 cases of acute appendicitis treated in St. Thomas's Hospital during the period 1937–42 inclusive, is of particular interest because of the emphasis it lays upon "appendicitis with mass." The definition given of such a mass is "a palpable lump surrounding an inflamed appendix," the mass consisting of swollen and œdematous omentum, mesentery, and coils of bowel surrounding the appendix. These cases are treated expectantly. The patients are put to bed in the low Fowler position; aperients, enemas and sedatives are forbidden; fluids in small amounts are given by mouth, and the pulse is recorded half-hourly. Conservative treatment is abandoned in the presence of a rising, or persistently raised, pulse rate, signs suggestive of a spread of infection, abscess formation, and, occasionally, a failure to resolve. Such expectant treatment is not advised in children, the aged, or in pregnancy, unless a firm and localized mass is present on admission. For those cases which have settled down satisfactorily, interval appendicectomy is recommended three months after resolution of the mass, unless age or the patient's general condition contraindicates an abdominal operation. Included in the series are 129 cases with

an appendix mass, and only one of these died: a patient with an appendix abscess which was drained on the fourteenth day and who died of a reactionary hæmorrhage. This gives a mortality rate of 0·8 per cent., compared with a rate of 1·17 per cent. for the 511 cases of simple acute appendicitis, and 15·6 per cent. for the 90 cases with diffuse peritonitis. The complication rate in those with an appendix mass was 7·8 per cent., compared with 9·2 per cent. for those with simple acute appendicitis, and 22·2 per cent. for those with diffuse peritonitis. In view of the well-known fact that the mortality in appendicectomy rises in proportion to the length of the history before operation, it is interesting to note that the average length of the history in patients with a mass was 7·2 days, compared with 1·42 days for those without a mass. On the other hand, patients with an appendix mass treated conservatively as indicated here, have a longer stay in hospital: an average of 32·9 days, compared with 12·6 days for those with simple acute appendicitis and 30·3 days for those with diffuse peritonitis.

COMBINED PENICILLIN AND HEPARIN THERAPY IN SUBACUTE BACTERIAL ENDOCARDITIS

USING the intravenous route and an average dosage of penicillin, 40,000 to 1,000,000 Oxford units daily (total dosage 867,000 to 48,930,000 units), and heparin sodium salt, 400 to 11,500 mgm. (total dosage), L. Loewe (*Canadian Medical Association Journal*, January 1945, 52, 1) has treated a series of patients with bacterial endocarditis. The optimum dosage of heparin was gauged by the tilt-tube Lee-White modification of Howell's method for determining blood coagulation time, a reading of 30 to 60 minutes being regarded as satisfactory evidence of an effectual anticoagulant level. In order to heparinize the blood effectively, subcutaneous deposits of 300 mgm. every second or third day are required, or approximately 200 mgm. daily of the aqueous commercial product when incorporated in the venoclysis. The estimation of the penicillin dosage requires sensitivity tests, and the results of these were used as the basis of the dosage employed. In the treated series the first few days of treatment were devoted to the determination of the penicillin levels, the heparin being withheld meanwhile. The tests were carried out with intravenous and intramuscular administrations; the intravenous was found to be the most satisfactory and only in rare cases, in which the patient was in congestive failure, was the intramuscular route used. As soon as possible the intravenous drip was employed, Ringer's solu-

REVIEWS OF BOOKS

Bone-Grafting in the Treatment of Fractures. By J. R. ARMSTRONG, M.D., M.CH., F.R.C.S. With a foreword by R. WATSON-JONES, B.Sc., M.CH.(Orth.), F.R.C.S. Edinburgh: E. & S. Livingstone Ltd., 1945. Pp. xii and 175. Figures 204. Price 25s.

IT is most fitting that Mr. Watson-Jones should write the foreword to this book, which is a worthy sequel to his standard work on fractures. Mr. Armstrong has adopted the same clear and practical method of presentation, his material being derived from an intensive experience in an orthopædic centre of the R.A.F. He first of all discusses bone-grafting in general—types, sources and operative technique—and then its application to particular fractures. His standard graft is the onlay graft derived from the tibia, and he secures fixation by means of screws. He uses a tourniquet as a routine, and gives the useful tip of the insertion of a Steinman pin through the muscles about the great trochanter to prevent slipping of the tourniquet when it is necessary to apply it at the root of the thigh. He enters into no detailed theoretical discussion on the mode of action of bone-grafts, a subject which has come into prominence again recently through the work of Mowlem, and accepts the view that the graft "dies and is replaced by living bone by a process of creeping substitution." It will be seen from the above that this book is primarily a technical manual for the surgeon, and it well succeeds in its object. The typography and illustrations are of the same high standard as Watson-Jones's parent work. An interesting reference in the appendix is to the desirability of specialized clinics for problem fractures transferred from other clinics.

The Electrocardiogram: Its Interpretation and Clinical Application. By LOUIS H. SIGLER, M.D., F.A.C.P. London: William Heinemann (Medical Books) Ltd., 1944. Pp. xvi and 405. Illustrations 203. Price 42s.

ELECTROCARDIOGRAPHY now forms an integral branch of cardiology; the help which it gives to the clinical diagnosis of heart affections is considerable, and the ways it can help are admirably presented in this book. Sigler has given to the reader in a clear form, richly illustrated with well designated cardiograms, the results of his experience during twenty years in clinical cardiology; the product is a most valuable book which should have a place in the library of all those whose practice is mainly concerned with heart disease. The undergraduate student will find here material greater than his need, but he would profit from the exercise of reading the many excellent cardiograms with their attached legends. The first three chapters deal with the electrical and physiological basis of the electrocardiogram, the methods by which it is recorded, and the characteristics of the normal tracing. Other chapters deal with the arrhythmias, coronary disease, infections, and the effects of trauma and drugs. A particularly pleasing plan is the description of electrical axis deviation of the QRS complex, and ventricular preponderance, in separate chapters; this has been done deliberately in order to remove the usual misconception that the two states are synonymous. Another innovation is the inclusion under myocarditis of changes in pericardial disease, giving emphasis to the fact that they are the direct outcome of myocardial injury. The chest lead most commonly used by the author has been IVF, but a whole chapter is devoted to a discussion of five other precordial leads. Misprints are inevitable in the first issue of a work of this kind, and for a succeeding edition, many of the references need to be corrected; but, altogether, it is a first-class book.

Mass Miniature Radiography of Civilians. By KATHLEEN C. CLARK, M.B.E., F.S.R., P. D'ARCY HART, M.D., F.R.C.P., PETER KERLEY, M.D., F.R.C.P., F.F.R., D.M.R.E., and BRIAN C. THOMPSON, M.D. Medical Research Council, Special Report Series No. 251. London: H.M. Stationery Office, 1945. Pp. 135. Figures 51. Price 3s.

THIS Report is based upon a survey of 23,042 individuals, carried out in Greater London during 1943. These individuals were drawn from two factories, over fifteen government departments, and a mental hospital. The report is divided into two parts; the first part is an exhaustive and admirable guide to the administrative and technical aspects of mass miniature radiography among civilians. No detail appears to have been overlooked, from the problem of how to obtain the maximum response from the workers in a factory in which it is proposed to carry out such a survey, to the precise method by which volunteers should be marshalled while waiting to be X-rayed. Needless to say, most attention is devoted to the setting up of the apparatus, its use and the clerical and technical organization of the work of the unit. This section will prove indispensable to all future mass radiography teams, although

doubtless each team will evolve its own modifications according to the conditions under which they are working. The second part of the report is of more general interest and reviews the findings of the survey. These are discussed in considerable detail, but the salient findings are that the total incidence of "significant" tuberculous lesions discovered for the first time as a result of the survey was between 1 and 1·5 per cent., whilst approximately one-third of these individuals had sufficiently severe lesions to demand immediate institutional treatment. The report is a mine of valuable information and will require to be studied carefully by all concerned with the health of the community, whether they be public health officers or clinicians, administrators or radiologists. It is one of the most significant documents in the annals of preventive medicine.

NEW EDITIONS

In preparing the second edition of *Clinical Electrocardiography*, by DAVID SCHERF, M.D., and LINN J. BOYD, M.D., F.A.C.P. (William Heinemann (Medical Books) Ltd., 25s.), the opportunity has been taken to carry out a thorough revision of the text and diagrams. This excellent textbook occupies a special position in the tremendous literature on electrocardiography by virtue of the skill with which the clinical and physiological aspects of the subject are correlated. The result is a unified outline of the subject which is as notable for its sense of balance as it is for its erudition. The sense of balance, so characteristic of the whole book, is well exemplified in the discussion of the relative merits of the old and new nomenclature of bundle-branch block; so many authors of recent textbooks on electrocardiography have accepted the new terminology without question that it is refreshing to find two authorities on the subject who are prepared to admit that there is much to be said for both terminologies and to give their reasons why, on the whole, they have decided to adopt the new terminology. Two other features distinguish this work. One is the wide scope of the references which are quoted, and the other is the inclusion of such important aspects of the subject as parasystole and reciprocal rhythm. This is not a book for the practitioner who merely wishes to be able to interpret simple electrocardiograms; but for the senior student and for the cardiologist who already have an elementary knowledge of the subject but wish to probe more fully into its intricacies there is no better book in the English language.

Hygiene (Manual of Public Health), by J. R. CURRIE, M.D., LL.D., D.P.H., F.R.C.P.ED., and A. G. MEARNS, B.SC., M.D., D.P.H., F.R.S.ED., in its

second edition (E. & S. Livingstone Ltd., 21s.) contains two completely new articles, on dietaries and nutrition respectively, and also chapters dealing with post-war housing and hospital planning. The work has been subjected to extensive revision, and the new edition, which is beautifully produced, will be warmly welcomed.

A SECTION dealing with the rôle played by the Rh blood factor in the pathogenesis of icterus gravis neonatorum has been added to *Clinical Atlas of Blood Diseases*, by A. PINEY, M.D., M.R.C.P., and STANLEY WYARD, M.D., F.R.C.P., in its sixth edition (J. & A. Churchill Ltd., 16s.) and the use of Rh-negative blood for transfusion has been included in the section on treatment. Another addition is the inclusion of two new plates in the chapter on pernicious anæmia. The value of this little book is shown by the demand for a new edition only three years after the publication of its predecessor.

A Synopsis of Forensic Medicine and Toxicology, by E. W. CARYL THOMAS, M.D., B.SC., D.P.H., in its second edition (John Wright and Sons Ltd., 10s.) has been brought up to date in all sections. In his dual capacity of physician and barrister the author is well qualified to present the essentials of this vast subject in a lucid manner, and practitioners will find much useful and concise information on forensic problems which are likely to occur in general practice.

IN the preparation of the fourth edition of *Medicine for Nurses*, by W. GORDON SEARS, M.D., M.R.C.P. (Edward Arnold & Co., 10s.) the author has included cross references to his work *Materia Medica for Nurses*, thus facilitating easy reference to the sister textbook. Although no major alterations have been undertaken, some new figures have been added and the work has been brought up to date by the addition of advances since the appearance of the third edition in 1939.

THE addition of a section dealing with the blanketing of a stretcher, and a section of coloured illustrations of typical war wounds to *Illustrations of Bandaging and First Aid*, by LOIS OAKES, S.R.N., D.N., in its third edition (E. & S. Livingstone Ltd., 6s.) greatly adds to the value of this most useful and generously illustrated book on bandaging. Other useful sections are those devoted to the treatment of shock, and first-aid measures in hæmorrhage.

The Student's Pocket Prescriber, by DAVID MITCHELL MACDONALD, M.D., D.P.H., F.R.C.P.E., in its twelfth edition (E. & S. Livingstone Ltd., 4s.) has been brought up to date in all sections. This little work is too well known and appreciated to call for detailed criticism.

NOTES AND PREPARATIONS

NEW PREPARATIONS

HYPERDURIC INJECTION SOLUTIONS — In the preparation of these solutions the acid radicals have been replaced by mucate, with the object of delaying and prolonging the absorption and action of the base. Three solutions have been placed on the market:—HYPERDURIC M.H.A. (morphine ¼ grain, hyoscine 1/80 grain, and adrenaline 1/160 grain per c.cm.) for pre-operative medication, obstetric analgesia, and for the relief of traumatic pain and shock: HYPER-DURIC MORPHINE (¼ grain per c.cm.) for the production of analgesia in inoperable malignant disease, visceral lithiasis, wounds and inflammatory conditions: HYPERDURIC ADRENALINE (1 in 1,000) for use in the treatment of bronchial asthma, allergic disturbances, and anaphylactic and surgical shock. The manufacturers are Allen & Hanburys Ltd., Bethnal Green, London, E.2, from whom further particulars can be obtained.

OXYGEN TENTS

THE twenty-four hour rental service for oxygen tents to hospitals and private patients, which has been in operation in London and the Home Counties for some years, has now been extended to the Oxygenaire branches at Bristol (Abson 81), Birmingham (Calthorpe 1737) and Manchester (Sale 5218). Tents can be obtained on loan for delivery for urgent cases in these areas by tele-

FIG. 1.

phoning at any time of the day or night to the numbers given. The illustration (fig. 1) shows the latest design in infant's mobile oxygen tents for transportation by ambulance to the infant's home or scene of accident. The detachable tent is on a trolley fitted with cupboards, and high oxygen concentration can be obtained rapidly from a control panel fitted with circulation control, de-oxygenator and extraction control. The temperature can be regulated from a compartment for hot-water bottles. The address for London and the Home Counties is Oxygenaire Ltd., 8 Duke Street, London, W.1.

OFFICIAL NOTICES

Penicillin—The Ministry of Health has issued a circular dealing with the indications for, and methods of, administration of penicillin. Although the drug is not as yet available for general use, the supplies are steadily increasing and it has been decided to increase the number of distributing hospitals or centres. The conditions in which the use of penicillin is advocated and the dosage recommended are given in the circular. *Hospital Catering* (Circular 44/45) has been issued to hospitals and sanatoria and deals with recommendations for reorganization of hospital catering, including the addition to staffs of a full-time, trained officer who shall be responsible for the ordering of foodstuffs, the preparations of menus, the management and control of kitchens and dining-rooms, and the arrangements for diets and conveying and serving food to patients. *School Medical Service* (Circular 29) gives the Ministry of Education's plans for the development of the School Medical Services. *Blood Transfusion.* A well-illustrated booklet entitled "Life Blood" and giving an official account of the transfusion services has been published by the Ministry of Information for the Ministry of Health and the Department of Health for Scotland, copies of which can be obtained from H.M. Stationery Office, price 6d.

PREVENTION OF DISEASE IN INFANTS

BY JEAN M. MACKINTOSH, M.D., D.P.H.ED.

Senior Assistant Medical Officer, Maternity and Child Welfare, Birmingham.

THE problem of the reduction of disease in the infant population of this country is one to which the individual general practitioner may feel he can make only a small contribution. He is concerned with the relatively small number of infants he meets in his practice and the detailed attention which they require, and he finds it more difficult to think in terms of a community of infants. He is aware that environmental influences have an important bearing on the morbidity and mortality rates among infants, but he finds it difficult to believe that he himself has any important part to play as a medical practitioner in the amelioration of such environmental influences. He is apt to think that these matters are the sole concern of the public health service, whereas any public health officer would be the first to admit that much of his effort is nullified unless he has the help and assistance of a well-informed body of general practitioners. It will be endeavoured in this article to show just where and how the general practitioner can make his contribution.

In attempting to improve the mortality and morbidity among infants, the first thing is to try to estimate the extent of the problem to be tackled. The dimensions of the problem in its relation to mortality are easy to obtain from the published statistics of the Registrar-General and the various annual reports of medical officers of health. The same exact information is not available to the same extent with regard to morbidity. In fact, morbidity in relation to infective disease is the only section about which extensive and reliable information is available.

When mortality statistics are examined, it is found that at least three times as many young children die in the first year of life as die between·the ages of one and five years. On the other hand, infective diseases tend in general to become more prevalent as the child grows older and establishes more contacts with others; the fatalities continue, however, especially in the case of measles and whooping-cough, to fall most heavily in the first year of life. Much the heaviest wastage of young life is therefore in the first year, and it is to this age-group that the greater part of this article will be devoted.

GENERAL CONSIDERATIONS

There are a number of general observations which must first be made when considering the mortality rate. The infant death rate has been more than halved

over the past thirty years. This improvement, however, has not been evenly distributed throughout the first year, as is shown by the following table abstracted from one shown in the Registrar-General's Statistical Review for England and Wales, 1937:—

INFANT MORTALITY

Rates per 1,000 of those in 1906–10

		Days		Weeks				Total under
		0—1	1—7	0—1	1—2	2—3	3—4	4 weeks
1906–10	.. ..	1000	1000	1000	1000	1000	1000	1000
1931–35	.. ..	930	900	914	672	509	524	781

		Months				Total under
		4 weeks—3 months	3—6	6—9	9—12	1 year
1906–10	.. ..	1000	1000	1000	1000	1000
1931–35	.. ..	434	386	382	385	531

Whereas the death rate from 3 to 12 months in 1931–35 was only about one-third of that between 1906–10, the death rate for the first week of life was still nine-tenths of what it was in 1906–10.

At the beginning of this period, 1906–35, the coldest months of the year yielded the highest death rate for the population as a whole, whereas the hot summer months yielded the highest toll of infant life. Now, however, the lowest death rate is found in the third quarter of the year and the first quarter of the year yields the highest infant death rate. This change-over is due mainly to the preponderant decrease in the number of deaths from gastro-intestinal conditions.

The highest regional infant mortality rate is to be found in the North and the lowest in the South-East. This is due, for the most part, to environmental and economic causes. The infant mortality also tends to increase with the density of persons per room. Recent investigations would seem to show that any density greater than one person per room has an effect on the infant mortality rate.

When the mortality of infants according to the social class of the father, as defined by the Registrar-General, is considered, it is seen that there is a steady rise in infant mortality from the well-to-do class I to the poor class V in all causes except congenital malformation and injury at birth. The rise is greatest in infective disease, ranging from a whooping-cough mortality nine times greater in class V, with deaths from bronchitis and pneumonia seven times greater, to diarrhœa and enteritis, which show a mortality rate four times greater in class V than in class I. The death rate from prematurity is not quite double and the congenital debility rate not quite three times that of class I. The poor are handicapped in two ways: their average income per family is less and they live in more overcrowded conditions. In addition, they have larger families.

Again, different studies have shown that the breast-fed baby has a much better chance of survival until the end of the first year, and during that period is likely to be freer from infection.

Finally, when the mortality statistics are examined in detail, it will be found that approximately half the infant deaths occur in the first four weeks, and that approximately three quarters of those are classified by the Registrar-General as due to developmental and wasting diseases. In fact, nearly half the total infant death rate under one year is due to developmental and wasting diseases, as the

following table will show:—

ENGLAND AND WALES, 1940

Cause	Percentage of Infant Death Rate
Developmental and wasting diseases	45
Respiratory diseases	22
Enteritis and diarrhœa	8
Infective disease (other than tuberculosis)	5
Injury at birth	5
Convulsions	2
Tuberculosis	1
Miscellaneous	12
	100

It will therefore be seen that the prevention of disease in infants divides itself naturally into two parts—first, what might be called indirect prevention and, secondly, direct prevention.

INDIRECT PREVENTION

A number of investigations have shown that the incidence of anæmia, pre-eclampsia and eclampsia, miscarriage, premature birth, still-birth, and primary uterine inertia, is greater among those women on a poor diet than in those on a good diet. In Chicago, between 1936 and 1940, with a highly organized service of care after birth, it was only found possible to reduce the premature death rate by 10 per cent. Therefore it is surely wise to exert every effort to see that the expectant mother gets a good diet, whilst at the same time taking every care of the premature baby after birth.

The importance of breast feeding.—It has also been found that whereas it·is possible to establish breast feeding in most cases, the maintenance of breast feeding is another matter. The percentage of breast feeding tends to fall sharply after the second week. This may be due to faulty management by the mother, the nurse or the practitioner, but it may also be due to inadequate diet of the mother during pregnancy, as well as after delivery. It is therefore most important, at the present time, that the mother should be encouraged to consume all the food supplements provided for her by the Ministry of Food during her pregnancy and lactation. In this the family practitioner can be of the greatest assistance in persuading her that these supplements are for herself alone, and not for any other member of the family. That there is much need for further education on this matter is illustrated by recent figures for the City of Birmingham, which show that only 45·7 per cent. of the expectant mothers take the vitamin capsules provided by the Ministry of Food. Although some mothers may obtain vitamin concentrates by private purchase, it is unlikely that their number would bridge the gap between 45 and 100 per cent.

Enteritis and diarrhœa account for 8 per cent. of the total infant death rate. This death rate is still far too high. In New Zealand, the infant death rate from this cause is one-sixth of what it is in England and Wales. Three-quarters of these deaths occur before the age of six months. The incidence and fatality rate is much greater among the artificially fed than among the breast fed.

With regard to the faulty management of breast feeding, the task of teaching and encouraging the mothers so that breast feeding is firmly established is one which calls for much time and patience : this time, the family practitioner finds difficult to give. He does not always appreciate that the services of the health visitor are at his disposal to help him in this. Indeed, he sometimes regards her as an employee of a rival firm. The health visitor, like most other people in these days, is usually overworked, but first things come first, and in a matter of this kind she would be glad to assist the family practitioner in encouraging and helping the mother whose lactation appears to be faulty.

By improving the diet of the expectant and nursing mother and by increasing the percentage of successful lactations, much can be done to prevent morbidity and mortality in infants due to prematurity, congenital debility and diarrhœa, which account for 53 per cent. of the deaths under one year.

Environmental conditions.—It is not without significance that those towns which show the heaviest overcrowding also show the highest infant mortality rates. For example, Glasgow and Birmingham are cities with populations of approximately one million. When the last survey was made, the overcrowding in Glasgow was found to be of the order of 30 per cent. and in Birmingham 3 per cent. For the period 1934–38, the infant mortality rate in Glasgow was 99 and in Birmingham 63. Overcrowded housing conditions and poverty favour the spread of respiratory and infective diseases, which are particularly deadly for young infants and account for 27 per cent. of the deaths.

Respiratory disease in infants may be primary, or follow an infection such as measles or whooping-cough. The death rate was seven times higher among infants born into social class V than among those born into social class I. Measures for prevention include reduction of overcrowding, the encouragement of breast feeding and strict application of rules of hygiene, so that, so far as possible, no-one with coughs or colds should come into contact with infants.

The first step towards the improvement of these environmental conditions is the education of public opinion. This is the day-to-day work of the medical officer in the public health service and it is a task he has to repeat many times, as public opinion is not created in a day. Here the individual practitioner can help to create an enlightened attitude of mind, not only among his patients, but in the community as a whole.

DIRECT PREVENTION

In measles and whooping-cough a high fatality rate is experienced, especially in the first two years of life. It is therefore of the greatest importance to defer the attack until the child reaches the age of six or seven, when he can offer a more adequate resistance to the disease. Scarlet fever and diphtheria also show high fatality rates in the early years. Infantile resistance to those acute specific infections to which the mother herself is immune, is conferred through the placenta or the milk. It is only present, however, during the first few months of life, and after its gradual disappearance the child becomes susceptible.

Measles.—Three-fifths of the deaths from measles occur under the age of two years and over 80 per cent. between 0—5 years. The Registrar-General, in his

review for 1934, showed that the measles mortality rate increased very greatly as the degree of overcrowding increased, and that it is enhanced by urban conditions. The proportion of deaths which occurred under two years of age in the rural districts was 40 per cent. and in the county boroughs 60 per cent. The mortality rate is mostly due to intercurrent pneumonia. A great deal more requires to be done in educating the public about the danger of measles, especially in the very young.

Adult immune serum, convalescent serum, placental extracts or parental whole blood may be used for the protection of very young children who have been exposed to infection. Placental extract has a tendency to produce reactions and is not so efficient. If given quite early after exposure, i.e., not later than the day of the rash in the original case, such measures will entirely prevent an attack. If given up to the sixth day after the appearance of the rash in the original case, it will modify the attack.

These methods of cutting short or modifying an outbreak are often used in institutions where there are very young children. They can also be used in individual susceptible children who have been exposed to infection. If the child is weakly, an attempt should be made to prevent the attack, if robust to attenuate it only. A mild attack in these circumstances is desirable, as it will produce immunity to subsequent infection. As supplies are short, serum should only be used for children over five years of age in exceptional circumstances.

Whooping-cough.—The largest number of deaths from this disease occur during the first and second years of life, especially during the first year. During this period it tends to be more fatal than measles. In at least 50 per cent. of the deaths there are respiratory complications.

It is possible that vaccines may be successful in securing, if not complete, at least a considerable degree of immunity to attack, and therefore they are well worth a trial. The vaccine must be freshly prepared and the dosage must be adequate. Three to four months should elapse between inoculation and exposure to allow a sufficient degree of immunity to develop. Immunization should begin before the age of six months. The immunity produced does not appear to be high or lasting.

Diphtheria.—The fatality rate from diphtheria is very high during the first two years of life and may be in the region of 60 per cent. Yet diphtheria is a preventable disease. The most suitable age to start immunizing is between the ages of nine months and one year. The interval between injections varies from two to four weeks, depending upon the prophylactic used.

Alum precipitated toxoid is now most commonly used. It is less soluble than simple toxoid. It prolongs the period of immunity and increases the antigenic effect. Two doses of alum precipitated toxoid are equal to three doses of the other preparations and are given at intervals of one month. Because of the high susceptibility of young children, the Schick test is often omitted. If the child has not been protected in infancy, he should be protected before entry into school. Even if he has been protected earlier, he should receive a "boosting" dose before entering school.

Scarlet fever.—During recent years the fatality rate of scarlet fever has been so low in this country that active immunization has not been worth while, particularly as the process has not reached the degree of certainty found in immunization against diphtheria.

Tuberculosis.—The prevention of tuberculosis in young infants has two aspects —the securing of a safe milk supply and the removal of infants from the vicinity of persons suffering from the disease. It is not sufficiently appreciated that milk from a tuberculin-tested herd may become contaminated by other organisms from the cow's udder, during milking or in transit, and that the only safe milk from the infant's point of view is that which has been heat treated. Whilst it is appreciated that infants should not be exposed to infection from young and middle-aged adults suffering from known open tuberculosis it is sometimes forgotten that they may be in close proximity to elderly people with chronic coughs, whose expectoration may contain tubercle bacilli.

Rickets.—Although severe cases of rickets have almost disappeared from among the child population, the recent inquiry under the auspices of the British Paediatric Association showed that there was still an incidence of 4 per cent. of rickets diagnosed radiographically in children during the first years of life. Rickets may be found in breast-fed children if the mother's diet is inadequate in vitamin D, if the child is growing very fast, or if breast feeding is continued too long. In fact, all infants should be given a vitamin D supplement, whether breast fed or not. The Government "cod-liver oil" compound as now issued has a vitamin D content of 700 to 800 international units per teaspoonful, and is adequate as a prophylactic. Some practitioners seem to think that the vitamin content of this Government preparation is inadequate and recommend their patients to use other preparations, which are usually more expensive and sometimes inadequate with regard to their vitamin D content. Here, again, there is much need for further education of the general public. The latest Birmingham figures show that only 32·8 per cent. of the infants eligible appear to be receiving the Government cod-liver oil compound. Some of the mothers say that it cannot be much good because it is so cheap and, in consequence, they buy more expensive preparations. Even so, it is likely that an appreciable proportion of the infant population is still not receiving any vitamin D preparation and a larger proportion is only receiving an inadequate dosage.

CONCLUSION

To summarize, the prevention of disease in infants has two aspects—indirect prevention, by means of improvement in nutrition of mother and child and improvement of environmental conditions, e.g. housing; and direct prevention, by the use of various prophylactics. Only if both aspects of the problem are dealt with simultaneously, can a rapid reduction in the incidence of disease among infants be expected.

COMMON FEEDING DIFFICULTIES IN BREAST-FED INFANTS

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IT goes without saying that a woman should breast feed her infant as a natural course of events, and that this act is a normal physiological one. This being the case, breast feeding would be expected ordinarily to be accomplished without difficulty and with complete success. Facts, however, prove the opposite. In modern civilized countries a large number of infants are not breast fed at all, and a still larger number are fed by their mothers only with difficulty, and often, until expert advice is sought, without success.

Although it is a natural act, a mother, especially if it is her first baby, is ignorant of many aspects of the technique of breast feeding, and as a result the baby may fail to thrive even if the mother appears to be secreting adequate milk. In this case she certainly does not know by the light of nature what to do in order to rectify matters. Often the supply of milk itself is insufficient, although the mother is willing and anxious to feed her baby and her method of going about this seems all it should be. It therefore behoves the practitioner to pay attention to this subject, if he is to be of real assistance. It is during the first three weeks that troubles as a rule arise. If lactation is properly established and the child is progressing well by two or three weeks of age, everything will then, in all probability, go ahead smoothly.

One of the greatest difficulties that has to be faced by the young mother whose infant is not progressing satisfactorily is, unfortunately, the attitude of many maternity nurses, who are all too frequently aided and abetted by the practitioner in charge. Their attention is apt to be centred too exclusively upon the weighing scales and, instead of taking a broad view of the child as a whole, the nurse is dissatisfied unless a gain of weight is achieved from the beginning. If, when she hands over, the baby is well above its birth weight, she considers she has been successful; if the baby has failed in this respect, so then has she. This does not necessarily follow at all. Often a baby, although contented and sleeping well, and actually in excellent condition, gains but little until after the third week, the reason being that the establishment of its mother's lactation has been slow. If it is not realized that full lactation is often established only very slowly, then the error of weaning prematurely will frequently be made, the mother being told that her milk "doesn't suit" the child, or that she "simply hasn't got enough" and that "it's no use trying any more." All too often the practitioner will subscribe to this, telling the mother that she must not worry herself for she is not to blame, and that artificial feeding is easy and safe. The fact of the matter is that such premature weaning is quite unnecessary in the vast majority of cases. It is often undertaken, not because it is proper, or even easier for the mother, but because it is easier for the practitioner and the nurse.

If the mother does not wish to feed her baby, or will not fully cooperate, then it is no part of a practitioner's function to chide or unduly coerce her. She should be told the great advantages of breast feeding, and if she will not undertake her part that is, after all, her affair. If, however, she is keen to breast feed her infant, then every help and encouragement should be given her to accomplish this. To bring this about, however, the practitioner and the nurse must themselves be conversant with the technique, and indeed with the whole subject of breast feeding.

DAILY REQUIREMENTS

In order to satisfy the infant's requirements, a food intake of 25 calories and a total fluid volume of $1\frac{1}{2}$ to 2 ounces per pound of body weight per day is, as a rule, sufficient during the first week of life. Thereafter, 45 calories and 2 to $2\frac{1}{2}$ ounces of fluid per pound of body weight per day is necessary throughout the first year.

To assess the amount an infant is actually getting from its mother, *test feeding* is carried out, that is, the infant is weighed before and after it has been to the breast. A single test feed is apt to furnish most fallacious results, as a woman yields *varying amounts of milk at different times of the day or in differing circumstances*, and an infant does not take a uniform amount at each feed. A series of at least three test feeds per day should be undertaken, and the average of these may be regarded as the infant's average intake per feed.

Complementary feeds.—In the first ten to fourteen days of life the most common cause of failure of an infant to progress satisfactorily is probably a slow, or poor, establishment of lactation, with consequent insufficiency of breast milk. A small complementary feed, given by spoon, will rectify this, but at the same time care must be taken to see that the breasts are regularly and completely emptied, if necessary by manual expression of the milk after the infant has been to the breast, this milk being given to the baby before the artificial food. The reason why the complementary feed should be given by spoon rather than by bottle is that it is inadvisable to allow the infant to get into the habit of sucking the teat of a bottle, from which it is easier for him to take than from the breast. With a steady gain in weight and an increase in the secretion of breast milk the complement can be reduced gradually, and eventually omitted. A "complementary" feed is one given *after* the child has sucked from the breast, in contradistinction to a "supplementary" feed, which is a substitution feed of artificial food given *in place of* a breast feed. This latter should not be employed except in the process of weaning.

PRACTICAL DIFFICULTIES

A common difficulty with lethargic or weak infants is their *failure to suck* vigorously and therefore to obtain all the milk secreted. Sometimes a small dose of thyroid, 1/10 grain, night and morning for five or six days, will stimulate such an infant and bring about the more vigorous sucking required. For the weakly infant it is often helpful to express the breast milk and give it by spoon until he has gained weight and strength, when he will be able to suck normally.

Retracted nipples or large bulbous nipples, too big for the infant to grasp, are a cause of an infant being unable to feed satisfactorily, whilst another common

difficulty arises from *sore or cracked nipples*. Here it is a case of prevention.being better than cure, and with proper management and care such troubles should not occur. Careful prenatal and postnatal care are of much importance in prophylaxis, and proper attention to the breast obviates many troubles from this source. During the last two months of pregnancy the nipples should be gently pulled out each day and rubbed between the thumb and forefinger, lubricated with a little lanoline; spirit should not be used on them as it is liable to harden the epithelium and predispose to cracking. The use of an all-rubber nipple shield is of great assistance in those cases in which the nipples are not easily grasped, or when cracks have occurred. When the breasts are unduly engorged and tense, some of the milk should be expressed manually before the beginning of a feed.

Nervousness and lack of confidence on the part of the mother are other reasons for failure to breast feed successfully. Sometimes a multipara is convinced of her inability to provide sufficient milk for her infant, because of her failure to feed with success one or all of her previous children. This may, of course, mean nothing except former improper management of breast feeding. Reassurance, coupled with a little firmness, and a sedative mixture prescribed for the mother and, in addition a small complementary feed for the infant until satisfactory progress is initiated, are the lines on which such cases should be treated.

MAINTENANCE OF MILK SECRETION

It not infrequently happens that the secretion of milk falls off at the time a woman gets up and begins once more to set about her household duties. This is not unnatural. After a period in bed she is called upon to exert herself considerably, and the extra effort involved in having again to cope with her home and look after the newly born infant has an adverse effect upon her yield of milk., Provided she takes things easily at first, is able to indulge in some period of rest during the day, and especially if she is of a reasonably placid temperament, the disturbance of the milk supply is likely to be temporary only. The mother should be told that normally breast milk appears thin and rather bluish in colour, like skimmed cow's milk, and that this appearance does not necessarily mean that it is watery or of poor quality. As a matter of fact it is extraordinarily rare to find any case in which the breast milk secreted is unsuitable for an infant. An inherent deficiency in milk secretion is uncommon. Although such cases do occur, this, as a cause of inability to breast feed satisfactorily, must not readily be assumed.

In order to improve the supply of breast milk the mother should be instructed to take adequate fluid, about 4 pints daily, and a full, well-balanced diet. An extra amount of protein and the vitamin B complex are probably helpful, but a mere increase in the caloric intake, if the diet is already satisfactory, does nothing towards improving milk secretion. Rest is important, but, above all, the breasts must be regularly and completely emptied, any milk left behind by the infant being removed by manual expression. Bathing of the breasts with hot and cold water alternately (using two bowls, one of hot and one of cold water) and a brisk rubbing with a rough towel twice daily, help by improving the blood supply locally. Except from the psychological angle, galactogogues have really little or no effect.

INFANTILE DIARRHŒA

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TREATMENT is here taken to include prophylaxis, both of the primary disease and of complications. Some knowledge of the fundamental clinical features and pathological changes, as well as of the etiology of infantile diarrhœa, is a prerequisite of success in dealing with this formidable disease of childhood.

NOTIFICATION

The protean character of the disease is reflected in the number of designations applied to it at different times; although unsatisfactory in certain respects, "D and V" remains the favourite clinical name, but infective or zymotic enteritis, acute gastro-enteritis, summer diarrhœa (a misnomer nowadays, as the disease is as prevalent, and even more severe, at other seasons) and cholera infantum (the fulminating form) are all used more or less synonymously. Contrary to common belief the disease is not generally notifiable in England and Wales; in London it is notifiable in nine only of the twenty-nine metropolitan boroughs (Paddington, Kensington, Fulham, Poplar, Greenwich, Deptford, Finsbury, Woolwich and, in July to September, Southwark), usually without restriction as to age. The disease should be made generally notifiable, at least while it remains prevalent and deadly, preferably limited in application to babies under one year; the term infantile diarrhœa (vomiting may be absent but diarrhœa never) is perhaps less open to objection than any other. In the absence of notification a reliable estimate of incidence is not possible, but the numbers of deaths (death rates per 1,000 live births given in brackets) in children under two years for the years 1938–44 generally indicate a rising trend:—3,295 (5·06), 2,812 (4·29), 2,891 (4·37), 2,985 (5·15), 3,414 (5·24), 3,518 (5·14), 3,600 (4·83), respectively. In view of the falling birth rate the position cannot be viewed with complacency, for it is probable that the incidence has increased even more than the deaths suggest, as recent advances in treatment have probably reduced case fatality to some extent.

ETIOLOGY

(a) *Predisposing.*—The chief factors in etiology are insanitary and overcrowded housing conditions, accompanied by unsatisfactory conditions of individual and communal hygiene; inability or unwillingness to breast feed (incidence and fatality tend to be high at three to six months, when a large proportion are prematurely weaned); care in institutions, especially of illegitimates, orphans and babies abandoned because of broken homes by reason of separation or war work. But individual factors also enter: some babies thrive and remain healthy in the most

unfavourable environment, whilst others living under the best conditions, cherished and carefully ministered to, occasionally even when breast fed, succumb to a first attack.

(b) *Exciting.*—Although efforts to identify a causative organism have so far failed, there are solid grounds for believing that the disease is due to a virus infection of the upper respiratory tract, at least in its typical epidemic form; whether the gastro-intestinal tract may be, or commonly is, also invaded by the same organism, as has been proved in respect of poliomyelitis, remains uncertain. It appears that neither the common cold nor influenza A and B viruses are the cause, but it has not been proved that other virus catarrhal affections (conceivably the hypothetical Y virus of influenza) are not responsible. Mastoiditis, bronchopneumonia and pyelitis, occurring apparently at the beginning or during the course of the disease, are more properly regarded as complications than as causes. Whether unsatisfactory dietary (cow's casein is deficient in the sulphur-containing protective amino-acids, tryptophane and cystine, compared with human milk) renders a child more vulnerable to attack has not been confirmed, at least from histological examinations of the liver, but full knowledge on this aspect is still lacking.

CLINICAL FORMS

All grades of severity, from one or two loose, usually green-tinted, stools, to sudden, intractable vomiting and diarrhœa accompanied by profound toxæmia, dehydration and collapse, are encountered; cases initially benign may develop, sometimes with alarming suddenness, into severe forms. Space does not permit a full clinical description but, on account of their immediate bearing on treatment, particular note should be taken of certain features: the sunken eyes with glassy stare; the ashen, clammy, lax or inelastic skin; the sunken abdomen and fontanelle; the weak, sighing or irregular respirations (denoting acidosis), or stupor and twitchings (alkalosis); the restlessness and insomnia, often associated with a whining cry from colic, which resembles the meningeal cry (meningitis occasionally is present); the occurrence of such features calls for immediate resuscitation measures. Different clinical types have been described, and undoubtedly the disease varies considerably from epidemic to epidemic and case to case in the same epidemic, but frequently the types merge or pass successively into one another in the same patient. The absolute and relative frequency of vomiting and diarrhœa, and the character of the material, provide valuable indications on treatment as well as on prognosis; continued vomiting, especially if fæcal, and orange-coloured, fluid stools are bad omens.

INVESTIGATIONS

Before treatment is undertaken, certain investigations upon which to found the principles of proper management are essential. As the causation is unknown, therapy must be symptomatic and restorative rather than specific and curative. There are two main problems demanding constant attention in severe cases, viz:—
(1) correction of disordered metabolism; (2) eradication or neutralization of

infection. The former is the more urgent and, if swiftly and efficiently effected, may, by maintaining the defence processes at a high pitch, avert the latter. It cannot be stressed too strongly that it is easier to maintain the normal, whether of fluids or nutritive substances, than to restore it. At first sight the task appears easy enough, provided the optimum standards are known, but so rapid, sensitive and intricate are the adjustments of metabolic processes, that damage, perhaps irreversible and irreparable damage, may be inflicted upon vital functions and structures before it can be detected by clinical examination or laboratory tests. The experienced clinician is able to dispense with many investigations, which if they involve repeated withdrawal of blood may retard progress or hazard recovery, if not promptly replaced as required. The need for reliable micro-analytical methods is particularly felt in this field, in which certain investigations are necessary to serve as a guide in treatment, especially when ground has been lost or progress checked.

(1) *Bacteriological.*—(a) Swabs of throat, nose, nasopharynx (the most important site), ear or other septic focus for pathogens or potential pathogens, with typing and testing for sulphonamide sensitivity.

(b) Examination of vomitus and fæces to exclude typhoid-dysentery-Salmonella infections, as well as giardiasis, and such-like, and to determine absolute and relative frequency of coliforms and enterococci.

(c) Blood culture in severe cases. Duplicate cultures (from deep jugular veins) are advisable, to check possible skin or laboratory contamination.

(2) *Hæmatological.*—Blood counts, hæmoglobin, hæmatocrit and blood sedimentation rate determination, as required. Additional tests, such as platelet counts, bleeding and coagulation times and prothrombin index, in special conditions.

(3) *Biochemical.*—In severe cases, plasma bicarbonate, total proteins, urea and non-protein nitrogen, serum calcium and chloride, and, in sudden collapse, sodium and potassium estimations, are helpful. Vomitus should be examined for free and total acids.

Urinary investigations include output, chlorides and the usual chemical, cytological and bacteriological examinations.

Additional tests are needed to investigate liver damage, the effects of which often determine the final issue; no single test so far has been found to provide clear-cut evidence of damage, but a combination of tests, of which the following are those generally found most applicable, may give some indication of its nature and extent:—

(a) Albumin-globulin ratio (normal 1·7 : 1); tends to be lowered, as the liver is the site of albumin manufacture.

(b) Quantitative van den Bergh reaction (normal bilirubin below 0·8 mgm. per 100 c.cm. 1 v.d.B. unit = 0·5 mgm.); may be raised in latent jaundice.

(c) Alkaline phosphatase (normal 5–15 mgm.); raised in obstructive jaundice and severe liver damage, such as acute yellow atrophy; decreased in severe anæmia.

(d) Blood amino-acids (normal resting 5 mgm., after a meal 8–10 mgm.); low in protein starvation, may be high in severe liver damage.

As exact measurements of optimum quantities are necessary, the fluid and caloric requirements at different ages and weights must be known; for males these are as follows (slightly less for females):—

Age	Weight		Height		Feed volume		Calories daily
	lb.	kgm.	inches	cm.	fl. oz.	c.cm.	
Birth ..	7·8	3·4	20	51	1·5–2	30–60	125–250
1 week ..	7·0	3·1	20·4	52	2·5	75	310
2 weeks ..	7·5	3·3	21·2	53	3·0	90.	375
1 month ..	8·5	3·8	22	55	4·0	120	500
2 months ..	10	4·7	23·2	58	4·5	135	600
3 „ ..	12	5·5	24	61	5	150	650
4 „ ..	13	6·2	26	65	6	180	700
6 „ ..	16	7·3	27·2	68	7	210	800
9 „ ..	18·5	8·5	29·2	73	8	240	900
1 year ..	21	9·5	30·4	76	8	240	1,000
2 years ..	26·5	12·5	33	82	10	300	1,200

The height:weight ratio is more accurate than the age:weight ratio.

The caloric requirement is approximately 100 calories, and the protein intake 3 to 4 gm. per kgm. body weight in twenty-four hours. Other daily requirements up to one year are:—iron 6 mgm., calcium 1·0 gm., thiamin 0·4 mgm., riboflavin 0·6 mgm., nicotinic acid 4 mgm., ascorbic acid 30 mgm., vitamin A 1500 I.U., vitamin D 400 to 800 I.U., according to age (Recommendations of Food and Nutrition Board, National Research Council, U.S.A.).

TREATMENT

(1) *MILD AND MODERATE CASES.*—Substitute Hartmann's solution (buffered Ringer-lactate) or half-strength saline for usual feeds for twelve to twenty-four hours. The caloric values per 30 c.cm. (1 fl. oz.) and percentage distribution of calories in the three kinds of milk are:—

	Calories	*Protein*	*Fat*	*Carbohydrate*
Human	20	8	47	45
Cow's	20	22	49	29
„ dried and reconstituted	16–18	15	35	50

If upper respiratory infection or fever be present, give sulphonamide (thiazole, mezathine or diazine) 1 gm., followed by 0·5 gm. four-hourly for five to seven days (for a baby of three months) with a sodium citrate mixture sufficient to keep the urine just alkaline. Resume feeds, usually full volume but half-cream variety and in $\frac{1}{2}$–$\frac{1}{4}$ strength, gradually returning to full strength as tolerated. If intestinal irritation or dyspepsia be present, castor oil, 3·5 c.cm. (60 minims), or grey powder, 0·01 gm. ($\frac{1}{6}$ grain), may help in some cases. Gastric and rectal lavage serve no useful purpose and are exhausting. Should vomiting and diarrhœa continue but dehydration and intoxication be minimal or absent, Hartmann's solution with

5 per cent. glucose may be given subcutaneously or intramuscularly (the latte route should be avoided if there is doubt regarding asepsis of materials or technique). Vomiting exercises a depressant effect and should be avoided by every means; if it tends to recur, sips of fluid, if desired with diluted fruit juice but no carbo-hydrate added, keep the mouth moist and supplement the rather uncertain absorption of parenteral fluid. Early vomiting is usually toxæmic in character being an accompaniment of the metabolic disturbances resulting from the primary invasion. At any stage it may recur from a number of causes; rise of coliforms in the alimentary tract, appearing in the vomitus; from bacterial invasion of the blood stream producing either bacteriæmia or septicæmia; reflexly, from intestinal irritation or from middle-ear cleft and meningeal infection.

The sulphonamides.—Neither sulphaguanidine nor sulphasuxidine have proved of value as intestinal disinfectants, nor have systemic sulphonamides been of constant therapeutic effect in preventing or remedying any of these complications. Some workers, notably Gale and Epps (1942), have considered the toxæmia to be due to absorption of intestinal bacterial metabolites elaborated by coliforms producing damage to the hepatic cells; if this hypothesis be proved correct, search for an antidote to these toxins, or more intensive sulphonamide therapy to inhibit coliforms, should provide the remedy, but the available data do not give it any positive support.

(2) *SEVERE CASES.*—Benign cases tend to pass into severe, especially if vomiting is a feature. Subcutaneous absorption practically ceases in shocked and dehydrated states, making intravenous infusion an urgent necessity. Highly skilled nursing is imperative, involving constant attention to apparatus and patient, with avoidance of excessive manipulation, especially exposure to cold. The head should be raised at times of feeding, but too much has been made of posture and the act of vomiting in the causation of otitis media. (Without infection, as in pyloric stenosis, it is exceedingly rare.)

Intravenous infusion.—Route: The internal saphenous veins at the ankle (using a suitable size Bateman's needle) are the first choice; thereafter the elbow veins. Tibial bone marrow (with Gimson's instrument) and scalp veins (with intradermal needle) are available later but are unsatisfactory for blood and may be troublesome with plasma.

Solution: Freshly prepared sterile Hartmann's solution, usually at half strength with 2·5 to 5 per cent. glucose, is best for diarrhœal cases in which basic ions are chiefly lost, precipitating a state of acidosis. Should vomiting be the chief feature, alkalosis is a more likely sequel, requiring for correction equal parts of normal saline and 5 per cent. glucose for twenty-four hours, thereafter increasing the sugar and decreasing the salt to avoid œdema. Usually at the end of twenty-four hours (or earlier if the disease has lasted several days) human plasma is added to the infusion, in the proportion of 1 part to 3 or 4, until oral feeding is established. This procedure has greatly improved the prognosis (Alexander and Eiser, 1944).

Amount: The basic fluid requirement is 150 c.cm. per kgm. body weight (2¼ fl. oz. per lb) in twenty-four hours, estimated on the actual weight and gradually raised, first to the weight before attack, then to the calculated weight for age or height. An additional amount, varying from 25 to 50 per cent. according to the

degree of dehydration, is needed in the first six to twelve hours to make good previous and current loss of fluid and rectify resulting hæmo-concentration. Amounts taken orally are deducted from the infusion so as to maintain as closely as possible the optimum intake, but in practice considerable latitude is permissible according to the particular needs of the case. The primary action of plasma is to restore and maintain the normal colloid activity of the blood; if an excessive concentration is given, fluid tends to be withdrawn from the tissues into the vessels, with possible circulatory overloading and cardiac embarrassment, whilst if too little is given, general œdema, with flow of fluid into lungs, serous cavities and meninges, may ensue and the patient be "drowned." The solids in the plasma, averaging 7·5 per cent., are also a valuable source of proteins, as of salts (electrolytes).

Rate: Usually 40 to 50 c.cm. for the first hour, thereafter 20 c.cm. per hour for babies under, and 30 c.cm. for babies over, six months. (An average drip apparatus at 12 to 15 drops per minute delivers 30 to 50 c.cm. per hour.)

Duration: Commonly forty-eight to seventy-two hours, or longer if vomiting, anorexia or profuse diarrhœa continue. The vein tends to leak or become thrombosed by the third to the fifth day.

Drugs.—Soluble sulphonamide is added to the drip while vomiting lasts; thereafter tablets are given orally. Restlessness and sleeplessness respond well to seconal or phenobarbitone, 0·02 to 0·01 gm. (⅓ to ⅙ grain) according to weight. No specific drug is available for allaying intestinal hyperactivity, but chlorodyne or nepenthe, 0·06 to 0·12 c.cm. (1 to 2 minims), may safely be given and prove effective.

Turpentine stupes or hot fomentations may be needed for intestinal distension and colic. In severe cases of gaseous distension, gastric or rectal catheters may provide some relief.

FEEDS.—The food employed before the attack (especially if breast milk) is selected, unless specially contraindicated, as for mild attacks, except that the initial dilution may be 1 to 6 or occasionally even 1 to 8. If raw cow's milk be employed it should be pasteurized, and may require, after modification to approximate to human milk, to be further treated according to individual needs by being acidified, citrated or peptonized. Some may tolerate whey, or secway (Trufood), better at first, but the majority of babies dislike it. Vitamin A 1000 I.U. and D 500 I.U., conveniently given in the form of adexolin, with ascorbic acid 25 to 50 mgm. daily, should be added to the twenty-four hours' total feed or in the morning and evening feeds, if these are prepared individually. In a week or two iron is given in most cases: a convenient mixture to add twice daily to the feeds is Mist. ferr. pro infant. (Nat. F., 1945):—

Ferrous sulphate	100 mgm. (1½ grains)
Dilute sulphuric acid	0·015 c.cm. (¼ minim)
Syrup	1·18 c.cm. (20 minims)
Chloroform water	3·5 c.cm. (60 minims)

Later, during convalescence, 15 c.cm. (½ fl. oz.) orange juice and 3·5 c.cm. (60 minims) cod-liver oil, twice a day, should be substituted for the vitamin concentrates.

of the posterior cervical glands, can occur in otitis alone. As mastoid pus, usually bilateral, although not necessarily at the same stage, is found in 80 per cent. of autopsies, and in a large proportion is directly responsible for death, the operation, which carries a negligible mortality under local anæsthesia, should never be omitted if there is a possibility that this complication retards the process of recovery. Ethmoid and sphenoid sinusitis are rarely the septic foci.

Bronchitis and broncho-pneumonia.—The incidence of respiratory complications fluctuates considerably according to season; these rarely cause death if chemotherapy has been properly applied. Pulmonary congestion and œdema were common before plasma was introduced, but pulmonary collapse still occurs sometimes in premature or debilitated babies, who may require oxygen (often with 5 per cent. carbon dioxide) supplied in a tent. Nikethamide, 25 per cent. solution in doses of 0·25 to 0·5 c.cm., given four-hourly intramuscularly or intravenously, is a suitable cardio-respiratory stimulant.

Pyelitis.—Proteinuria and bacteriuria are present in nearly one-half of severe cases, but frank pyelitis is infrequent, occurring in only about 1 to 5 per cent. Coliform infections comprise more than half the total; they tend to be resistant to sulphonamides—indeed they may actually appear during an intensive course of the drug—but often respond to combined sulphonamide and mandelic acid therapy.

Bacteriæmia and septicæmia.—Differentiation between these conditions is, in the final resort, based on the clinical evidence, although the bacteriological findings, such as bacterial species isolated and the numbers grown per c.cm. blood, provide valuable information. The organisms found in septicæmia are the hæmolytic streptococcus, *Staphylococcus aureus*, and pneumococcus, almost always singly, whilst coliforms, enterococci, *Staph. albus* and diphtheroids, usually singly but not infrequently in combination, are most common in bacteriæmia. The former condition is almost invariably an indication for mastoidectomy and responds well to penicillin therapy (Burns and Gunn, 1944), but the bacteriæmic group is characteristically resistant to all forms of chemotherapy, and evidence of mastoid disease at operation is often minimal or absent.

Anæmia and hypoproteinæmia.—These are common and often unsuspected complications, usually occurring in patients whose recovery is marred by relapses. Plasma and blood transfusions are indicated but some respond better to iron and liver extract, presumably owing to liver damage.

Hepatitis.—Liver damage is an essential feature, probably the most important morbid condition, of the disease and therefore not strictly a complication. Whilst methionine may prevent further damage it is hardly likely by itself to repair damage already done, although the experience of Beattie and Marshall (1944) suggested a therapeutic effect in post-arsphenamine jaundice. Too intensive amino-acid therapy may actually be dangerous if the damage is extensive.

Purpura and circulatory collapse.—These may occur independently, but hæmorrhage into the suprarenals, accompanied by sudden circulatory collapse (Waterhouse-Friderichsen syndrome), may be the only purpuric manifestation, detected by a fall of serum sodium and rise in the potassium level; an active cortical

extract is more likely to help than the synthetic preparation desoxycorticosterone acetate, but the outlook is always unfavourable.

Convulsions.—Although nowadays uncommon, a convulsion in the initial phase does not necessarily carry a bad prognosis, but occurring as a late event it usually ushers in the terminal phase. The etiology remains obscure; it can occur with a normal serum calcium, which is not inconsistent with a low ionized (active or diffusible) calcium, which is accurately determined by perfusion of the isolated heart of the frog, but for clinical purposes can be calculated from the plasma proteins and inorganic calcium according to McLean and Hastings' nomogram (1935), reproduced in Starling's Physiology (1941). Intravenous calcium gluconate, 10 per cent., and hypertonic glucose, 10 to 20 per cent. in distilled water, may help in reducing cerebral œdema, whilst lumbar puncture and sedatives, such as sodium gardenal and chloroform, are useful adjuvants.

Marasmus.—This once common sequel is rarely encountered nowadays, since plasma therapy and mastoidectomy were introduced.

PROPHYLAXIS

(a) *In the home.*—Breast feeding is the chief factor; the amount taken should be checked by test weighing, if weight increments are sub-average. Instruction of parents regarding the risks of respiratory and alimentary infections in other members of the family should be the duty of everyone engaged in medical and social education. Indiscriminate fondling and kissing of infants should be deprecated. A well-regulated hygiene, in which method and punctuality have a high place, is more important than special dietaries and vitamin supplements.

(b) *In institutions, including hospitals.*—A sick infant should be nursed in a separate room or compartment, with strict observance by all (resident medical officers, nurses and visitors) of aseptic technique, including the use of masks. When such a technique is intelligently applied the separation of the attendant staff into "changers" and "feeders" is unnecessary and may actually conduce to relaxation in other directions.

(c) *General.*—At all times babies should avoid parties and occasions in which intimate contact and risk of infection may occur, including attendances at practitioners' surgeries and out-patient departments. An acutely ill child should be seen in its home, by consultant and practitioner alike, and removed to hospital only when the clinical condition demands specialized medical and nursing care, which in this disease is particularly exacting.

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INFANTILE ECZEMA

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CONSIDERABLE confusion still exists between dermatitis and eczema. Eczema may be defined as "an eruption peculiar to a hypersensitive skin, the hypersensitivity being inherited or acquired." The inherited quality which thus predisposes to eczema is most evident in infants, and the study of eczema in the first decade is most helpful in the understanding of the disease in adults, which is often a relic of infantile eczema but may, of course, be acquired at any age.

The primary lesions are minute papulo-vesicles arising in small groups on areas of non-inflamed skin. The vesicular nature of the lesion, although appreciable early microscopically, may not be apparent clinically, but scratching reveals the vesicular nature of the tiny papules by freeing the exudate and leading to weeping eczema. Subsequently, the exudate, which is plasma, may dry into golden crusts or, if excessive, will persist as weeping points which may be confluent. Since plasma is an ideal culture medium for pathogenic bacteria, secondary infection is early, almost invariably producing either the typical lesions of impetigo or a more diffuse pus-coccal dermatitis. At this stage the lymphatic glands associated with the area of the eruption become enlarged and often cause alarm to the parents.

Having defined the true eczematous eruption, it is necessary to distinguish dermatitis. When friction or some local irritant is applied to the skin a localized area of erythema is the first visible reaction. If the irritant is a strong one, blisters may arise upon the erythematous area, but should the patient be an eczematous subject any irritation of the skin is likely to provoke an eczematous response. In this event the characteristic eruption of grouped papulo-vesicles will appear through the erythematous area and the subsequent course will be exactly that of simple eczema. In seborrhœic subjects with much scurf, a seborrhœic dermatitis may arise as a scaly erythematous condition affecting the scalp and the scalp margins, and tending to spread to the retro-auricular folds, creases of the neck, and flexures of the body. If the subject is potentially eczematous the weeping points of eczema will again complicate the picture. When the eczematous eruption needs to be provoked by a seborrhœic condition, or by some definite external irritant, the prognosis is naturally better than when the condition arises idiopathically, although the seborrhœic diathesis is itself unfavourable.

ETIOLOGY

Although eczema is the reaction of a hypersensitive skin, the hypersensitivity undoubtedly depends upon constitutional factors and, in many cases, especially in Besnier's prurigo, psychological factors are of paramount importance. Thus, the emotional relationship between mother and child may clearly account for exacerbations of eczema, and some authorities believe that breast feeding should be discontinued on this account. As mother's milk is the least likely food to contain provocative antigens, the matter should be considered carefully before putting

the infant on a bottle, but in dermatological experience infants are rarely allergic to specific foods. Even when skin tests indicate specific sensitivity to some foodstuff it is often found that omitting the food has no effect upon the eczema, and most of the dietetic restrictions imposed in this condition are unnecessary. An intelligent mother can soon determine whether or not a food upsets her child, and a short period of trial will establish the fact. It is sometimes advisable to restrict starch, sugar, and fat, and cases have been observed in which changing an infant's food from rich Jersey milk to ordinary milk has been followed by the clearing of eczema. The addition of starch to the basic milk food of an infant should be delayed until the eighth or ninth month if the child is fat and has seborrhœa. Oatmeal and groats have long been regarded by the laity as heating foods, and, as oatmeal contains an anti-vitamin D factor, it is probably well to exclude this article from the patient's diet altogether. Vitamin therapy has been extensively tried without any consistent result, so that, although it is certainly desirable to ensure that the growing infant has an adequate vitamin intake, there are no special indications.

The allergic factor in the etiology of eczema has been over-stressed and the substitution of the simpler word, hypersensitivity, clarifies the problem. The hypersensitivity is rarely specific, although the provocative nature of, different antigens varies considerably. The hypersensitivity shown by the eczematous infant is rarely confined to the skin, but involves the mucous membranes. Catarrh or hay fever is not uncommon, and in the flexural type of eczema asthma is prone to develop and either alternate with the eczema or occur with it. The failure to influence these diseases favourably, and the great variety of therapeutic agents and devices employed, appear to indicate that the phenomena are due to an ectodermal irritability which is essentially part of the patient's pattern. The same irritability can be perceived in the character and emotional reactions of the patient. This is to be expected, since the central nervous system is derived from the ectoderm. So it is that the skin reacts to stimuli which are subminimal for the ordinary individual, just as the skin of a patient with epidermolysis bullosa reacts by blistering to subminimal trauma. This latter condition is a hereditary defect, and many cases of infantile eczema have familial histories of eczema, asthma, hay fever, migraine or urticaria which are just as striking as in the case of epidermolysis bullosa and other congenital anomalies.

Heredity.—In the inherited group of cases the hypersensitivity of the skin is obvious, but all degrees of latency must occur, and therefore when eczema does arise after some mild provocation the probability of a constitutional predisposition should not be dismissed. A tendency for eczema to arise upon seborrhœic dermatitis has been mentioned and eruptions are common with teething or following vaccination. Damage to the skin by vaccination, or by injury or a burn, or through a contact dermatitis arising from an irritating application, such as a sulphonamide ointment, is apt to sensitize the skin, and symmetrical eczematous eruptions are common sequelæ. Thus, any external irritant may provoke eczema, but too much attention should not be given to the milder agents which are tolerated by a normal skin.

Amongst the *predisposing causes* of eczema might be mentioned xerodermia and ichthyosis, which are chiefly associated with flexural lesions. Hyperidrosis also

involves the flexures as a simple intertrigo which may become infected and eczematous. Focal sepsis may be important, particularly in chronic eczema of the hands and feet. Here the common lesions are of the pompholyx type, grouped vesicles set more deeply on the palms and soles and apt to persist on, and between, the digits. Such cases may resist local therapy completely and only disappear dramatically after the removal of septic tonsils or carious teeth. Absorption of toxic products from the alimentary canal is thought to account for sudden and symmetrical eczema in childhood, and successful treatment based on this hypothesis lends some support to it.

CLINICAL FEATURES

Three types of eczema are common in infancy. The first is the *simple facial type.* Here the eruption occurs usually on the malar areas of the face, and, as the little patient rubs the face against the pillow or its mother, the eruption spreads widely across the cheeks, and than may involve the scalp and extend to the limbs and trunk. The earliest lesions are characteristic groups of minute, pale pink papulo-vesicles which occur on the unaltered skin, but friction and the application of ointments quickly account for an erythematous background.

The second type is similar, but the first signs are *scurf in the scalp* and a scaly erythematous condition spreading on the scalp margins, about the ears, and to the neck. This is an early seborrhoeic dermatitis, and through it the facial type of eczema appears. Often it attacks the sides of the face first but may begin in the scalp, where dried exudate simulates an excess of scurf and the eczematous basis may be overlooked. Vigorous treatment of the seborrhoeic condition is likely to aggravate secondary eczema, which then quickly erupts upon other parts of the body.

The third type of eczema is the *flexural type.* Moderate or severe degrees of xerodermia or ichthyosis and a familial history of other allergic manifestations are common in this type. Sometimes the typical eczematous eruption appears quickly in the flexures of the arms and the back of the knees and about the wrists, and then may extend to the face and larger areas. In other cases, irritation is the first symptom and the resulting scratching may bring up true eczema or, if the exudative process is less marked, areas of thickening or lichenification develop. In other cases, discrete follicular papules characteristic of other forms of prurigo may develop. This flexural prurigo of infants and children is often called Besnier's prurigo. In all cases the primary eruption of eczema may lead to extending weeping areas, or the plasma may dry into golden crusts or largish sheets, and secondary infection either produces impetigo or a more diffuse pus-coccal dermatitis. The latter may be of the pale seborrhoeic type. In the flexures, septic fissures may develop and prove resistant to treatment. Persistent friction inevitably thickens the skin and produces lichenification, unless the surface is delicate and remains soft and moist. Enlargement of the lymphatic glands is common. The irritation is present by day but is apt to be worse at night, or when the patient is bored, frustrated, or tired.

TREATMENT

The essentials of treatment are:—(1) Competent nursing to ensure that the infant is made as comfortable and contented as possible and prevented from damaging the skin, by the use of restrictive appliances combined with adequate sedatives if necessary; (2) the avoidance of any external irritant or a factor known to provoke

irritation of the skin; (3) the application of cooling and emollient preparations and protective pastes.

In the first place mother and nurse must be educated to a proper concept of eczema, so that instead of striving to cure the condition with one of the innumerable remedies prescribed or advertised for the purpose, an attempt is made to understand the reactions of the patient, to find what environment and foods best suit the child, and if any specific factors act as irritants. Too much affection should not be displayed, otherwise when the parent or nurse is out of sight the child reacts by a fit of crying and a bout of scratching.

Constipation should be corrected, and small doses of grey powder and a rhubarb and soda mixture are useful for this purpose. Strong aperients should be avoided, because if diarrhoea results the eczematous infant may be in danger. It is a curious fact that in infancy, eczema of any severity predisposes to sudden death if acute infection of the respiratory tract or bowel occurs.

Small doses of *alkalis* are helpful in seborrhoeic subjects and *sedatives* are often essential to diminish the general irritability. A mixture of sodium bromide 1 grain, sodium sulphate 1 grain, sodium citrate 3 grains, and water to 60 minims may be added to each bottle, and, in addition, syrup of chloral or phenobarbitone $\frac{1}{4}$ grain may be given at night. Occasionally acid therapy is more helpful: 10 or 15 minims of dilute hydrochloric acid or lactic acid may be added fo each bottle. Glucose may be better tolerated than cane sugar, and in weeping eczema extra calcium and vitamin D may be given with it.

Diet.—Ordinary boiled cow's milk is as good as anything if the baby is not breast fed, and rich Jersey milk or "extra" cream is best avoided. If the child appears to be satisfied with its food and is contented and gains weight and has normal stools the eruption is no indication for a change. It is only exceptionally that a change to dried milk preparations or to "allergilac" is successful, and the usual history is of many changes in an infant's diet without any effect whatever upon the clinical condition.

LOCAL TREATMENT.—When the skin surface is broken by weeping points of eczema, plain water acts as an irritant, since it is drawn into the skin by the salt content of the cells, which are thereby damaged, setting free histamine and provoking further dilatation of the capillaries. Thus, washing often results in increased redness and weeping of the eruption, and cleansing with oil is frequently advised as a substitute. Although this succeeds at first it usually leads to over heating of the skin and to retention of sweat and exudate, which encourages infection, so it is much better to use normal saline or 1 per cent. of sodium or bicarbonate of soda, and if these solutions are not tolerated, a small of boiled milk to which 1 per cent. of strong solution of lead subacetate added may be used instead. After gently cleansing the skin by this a trace of a bland soap, the skin surface should be dried by blotting towel. Any form of friction will increase the erythema and exudat surface an application of a bland talcum powder or simple sufficient in mild cases When weeping persists, a thin film applied. Sometimes a wet compress of lead lotion under a firm not exceeding one hour, may stop the weeping.

Calamine lotion may be modified by the addition of 1 per 1 per cent. precipitated sulphur, for the seborrhoeic patient.

tissue comes between it·and the stethoscope. The cough will be more marked Sputum is scanty until the resolving stages, and in any case is almost alway swallowed and therefore is not helpful in diagnosis.

Radiological findings.—An X-ray taken between the second and third day wil almost certainly show a fairly well-defined area of increased density. The edge: are not sharp but the area, taken as a whole, is quite clearly defined. The densit: is homogeneous throughout, giving the "ground-glass" appearance. Th diaphragm on the affected side, with its action reflexly inhibited, will be higher The costo-phrenic angle will be clear, unless there is an effusion. The great valu of X-rays in diagnosis cannot be over-emphasized. In some cases the physica signs and respiration rate make the recognition of pneumonia easy. In many however, this is far from being the case, and an X-ray photograph may clinch the diagnosis.

When the effects of severe general toxæmia persist, and yet no sign of pneumoni: is forthcoming, the practitioner will have to search carefully, and soon, for othe serious diseases of infancy. Pyelitis and otitis media come to the mind, for th infant cannot tell his symptoms.

One of the most trying dilemmas is when signs suggestive of meningitis o: meningism are present. In the alveolar pneumonia of infancy "meningism" occur: with quite appreciable frequency: the facial expression is anxious, or pained or shows a "far-away" stare, and there is slight neck rigidity. Such appearance: are identical with what is met with in the earliest phases of meningitis, and n clinical examination will distinguish between the two conditions. If the evidenc of the presence of pneumonia is convincing—if it is early in the disease—and i the neck rigidity is really slight, increase the dose of sulphathiazole up to tha suitable for meningitis, and watch for twenty-four hours. All trace of th "meningism" should be gone in that time, and ordinary pneumonia dosage may be resumed: but if the requirements just enumerated are not all satisfied have lumba puncture carried out without delay.

TREATMENT.—The treatment of alveolar pneumonia is at present straight-forward. All the usual nursing care is given, with attention to thirst, the action of the bowels, and every comfort that a skilled nurse can supply. The child is nursed in an airy room or, when possible, right in the open air, on a balcony. (Some of the indications for and against open-air treatment will be discussed when considering broncho-pneumonia.)

Chemotherapy.—The greatest reliance at present is on the use of one of the sulphonamide drugs. At the moment of writing it seems clear that sulphathiazole is· the drug of choice. Sulphapyridine, whilst not more efficacious, is more apt to cause vomiting and other disturbances. Sulphathiazole is remarkably well tolerated, and in particular by children. The essential is to keep a sufficient concentration of the drug in the blood stream until the disease is completely vanquished. For this reason a relatively much higher dosage is given to infants than to adults. Presumably infants destroy and excrete the drug more quickly; certainly, weight for weight, they require much higher amounts. The following

suggested dosage is expressed in terms of half-gramme tablets of sulphathiazole:—

For a baby of one month, one tablet four-hourly (six in twenty-four hours) until twelve have been given, then four tablets daily until a further twelve have been given.

For a baby of six months, two tablets at once, then one four-hourly until eighteen have been given, then four daily until a further twelve have been given.

For a baby of a year old, two tablets at once, two four hours later, then one every four hours until twenty-four have been given, and four daily until a further twelve have been given.

Intolerance to sulphathiazole is rarely met with. In the early stages, vomiting may be confidently disregarded and the dosage pushed firmly; as the pneumonia is overcome the vomiting ceases, despite the continuance of the drug. Rashes are not an indication to stop the drug, and are rarely met with. A severe fall in the polymorphonuclear count is perhaps the only important warning to lessen, or to stop, the drug. It is only when the drug must be persevered with for longer than usual with a rather high dosage, as, for instance, to try to overcome an incipient empyema, that the white count has to be checked regularly.

Should pleurisy accompany the pneumonia, it is most important to have established a high dosage with sulphathiazole before effusion develops, for while the pneumococci are in the vascular pleura they can be checked, but when they are free in a pleural effusion they are largely beyond the reach of the drug, and it is likely that an empyema will follow.

The *prognosis* is usually good. Empyema and otitis media are the complications chiefly to be feared.

BRONCHO-PNEUMONIA

In the severe illnesses known as broncho-pneumonia, the pathological changes in the bronchi and lungs may vary considerably, and the clinical course shows corresponding variety. Close on this ill-defined borderline lie nearly related illnesses, as, for example, obstructive and suppurative bronchiolitis, with or without areas of lung collapse.

In this brief article a typical case of broncho-pneumonia will be described, chiefly for the purpose of discussing treatment. Thereafter, some of the more important of these closely allied conditions will be mentioned.

Mode of onset and symptoms.—The organisms are usually of a mixed variety, and enter through the respiratory passages. In the beginning the illness may have started as an ordinary cold or bronchitis, influenza, or one of the many children's infective ailments, such as measles or whooping-cough.

Respiratory symptoms are manifest before the child is very ill. Cough is usually prominent. There is sputum, sometimes scanty, often abundant, although usually swallowed and not seen. The child's condition insidiously gets worse, as toxins from the various bacteria are absorbed from the large surface presented by the whole respiratory tract. The temperature, irregular and swinging, tends gradually to become higher. The respiration rate again outstrips the usual ratio. The breathing may become extremely distressed. Cyanosis will be apparent, and may be extreme.

Signs of pulmonary involvement.—It is difficult in any given case to say when the

the standard cough mixtures are often useful. The usefulness of alkalis must be mentioned. They may be given alone or added to cough mixtures and may greatly help the feverish, cyanosed infant with a concentrated acid urine. Cough mixtures often cause vomiting and increase anorexia, and most babies do better without any.

Regarding *convalescence*, emphasis must be placed on the psychological and occupational needs of the small child, on the frequency of some secondary anæmia calling for appropriate treatment, and on the fact that children during convalescence are usually very active in bed, so that their muscles do not get soft as those of an adult may; whereas, once they are allowed up, it may be difficult to control the degree of their activity, so that the getting-up stage should not be started too soon.

PROGNOSIS.—The prognosis in broncho-pneumonia must always be a matter of some anxiety, and will often be grave. The bacteria causing the illness are usually mixed, and the practitioner cannot rely securely upon a response to sulphonamides. The disease often occurs in under-nourished infants, or in those already weakened by another illness. Its prolonged duration may throw great strain on the infant. Adjacent mucous surfaces, the Eustachian tubes, and alimentary tract may become involved.

In endeavouring to estimate the prognosis in a particular case, the practitioner will be guided by the following considerations. Very young infants, and particularly the premature, have a lessened chance of surviving the illness. The previous health and state of nourishment will influence the outcome. The breast-fed infant has, in general, the better chance. The practitioner will endeavour to estimate the toxicity of the organisms in the respiratory tract, as shown by the colour, pulse, vigour, and appetite.

Evidence of obstruction in the small bronchial tubes will be carefully weighed, both local signs and the degree of interference with the respiratory exchange being considered. When obstruction in the bronchioles is widespread, involving, say, 80 per cent. of the airway, the prognosis is grave. An obstructed bronchus in one area only does not convey the same immediate threat, but the more remote prognosis is adversely affected, in that subsequent fibrosis and bronchiectasis may follow. Suppuration, whether in bronchioles or in the lungs, is extremely fatal, but difficult to ascertain during the patient's life. X-rays will assist in defining larger areas of consolidation or of pulmonary collapse, but the prognosis, as already mentioned, does not necessarily bear much relation to these.

PROPHYLACTIC MEASURES

The prevention of pneumonia is a most important subject. Everything that will restrict the spread of air-borne infections is of great importance. The problems of housing and overcrowding represent one aspect of this effort. The teaching of personal hygiene, of room ventilation, and of the prompt and adequate treatment of coughs and colds is another approach.

Most important of all is the maintenance of the highest level of health in all infants, so that fewer will contract pneumonia, and of those who do, a larger

number will successfully overcome the disease. An increase in the breast feeding of infants should be placed first among the means to this end. Many illuminating articles in the recent literature have emphasized the better resistance of the breast-fed baby to such illnesses as pneumonia. Skilled supervision of every infant's nutrition is most desirable. The adequate supply of the needful vitamins, and of iron, must be ensured whenever necessary as a prophylactic measure before any illness has occurred. Fresh air, daylight and sunlight must be generously available to every infant in the highest possible amounts.

OTHER TYPES OF PNEUMONIC ILLNESS

Exudative bronchitis.—Certain conditions differing from the above description call for brief notice. Every now and then a small child is seen whose illness has come on with all the suddenness of alveolar pneumonia, whose respiratory distress is great, perhaps a breathing rate of about 80, in whose chest at every point can be heard coarse, medium and fine crepitations, but who will probably have a normal, or nearly normal, temperature, and a great deal of energy. These sudden conditions of what may be designated an exudative bronchitis have not the type of onset or toxic severity of true broncho-pneumonia. They are usually found in children of allergic tendency, nervous instability, or suffering from the spasmophilia associated with rickets, although the attack may be precipitated by bronchial infection. A small child's bronchial tubes are in any case narrow, and a little œdema of the mucous membrane plus an increase of exudate may obstruct a large proportion of the air passages, and cause great distress. The hypodermic use of atropine sulphate is here of the greatest value, although it should be used with the utmost caution in the severe toxic broncho-pneumonia already described.

Staphylococcal bronchiolitis.—It has been remarked that broncho-pneumonia is usually the result of a mixed infection of the respiratory tract. In some cases the staphylococcus plays a predominant part. If this is so, there is a tendency to a severe obstructive bronchiolitis with pus formation in the small bronchi, and perhaps in the alveoli. Small lung abscesses are formed. The condition is extremely toxic, markedly obstructive to the respiratory mechanism, and recalcitrant to treatment. Not infrequently a small staphylococcal abscess will perforate into the pleura, giving rise to pyo-pneumothorax. It is extremely difficult to diagnose the predominant influence of the staphylococcus until the condition has reached such severity that it must be suspected, or a staphylococcal empyema has been caused, when it can be confirmed. In these circumstances, effective treatment is usually too late. It is to be hoped that the days are not far off when the administration of penicillin will not be so restricted as, of necessity, it is at present. Thus it may be possible, when a broncho-pneumonia is not responding well to the kind of treatment outlined above, to use penicillin without delay, even before the organism can be proved. To a baby from six months to a year old, 100,000 units in 100 c.cm. by intramuscular drip would be given in twenty-four hours, repeating 50,000 units daily by the same method for many days thereafter. Again, the early use of such a treatment would be a main point, for once pus is formed the organisms are less easily reached.

an interference with the function of nerve cells and their fibres, causing the peripheral neuritis of dry beri-beri. Deficiency of riboflavin causes seborrhœic dermatitis, affecting particularly the nostrils and alæ nasi, the hair margin across the forehead and behind the ears, the anus, scrotum, prepuce and vulva; angular stomatitis and cheilosis; glossitis; diminished visual acuity and superficial keratitis. Severe deficiency of niacin causes pellagra, accompanied classically by dermatitis, diarrhœa and dementia; there is also glossitis. Pyridoxine is alleged to cure certain cases of cheilosis (Smith and Martin, 1940); and deficiency of biotin has been described as causing glossitis, dermatitis and a curious ashy pallor (Sydenstricker, et al., 1942). In animals treated with certain sulphonamides (such as sulphaguanidine), agranulocytosis develops and can be cured by administering folic acid (Daft and Sebrell, 1943; Higgins, 1944); this vitamin has not yet been proved to be useful in treating the similar condition in man, and the gravity of the condition scarcely warrants a controlled therapeutic trial with it. Gross deficiency of ascorbic acid (vitamin C) causes scurvy, with gingivitis (if the teeth be present), perifollicular petechiæ, diminished healing of wounds or fractures, and sometimes microcytic anæmia. It has been suggested that deficiency of another nutrient, vitamin P, which is found mainly in fresh fruits and vegetables, can cause purpura in man.

DIAGNOSTIC AIDS

Visual magnification is often an essential aid to diagnosis, whether it be produced by a hand-lens, binocular loupe or slit-lamp microscope. Such magnification is necessary in different degrees for the inspection of the skin, the tongue and the eyes. For examining the papillæ of the tongue or details of skin lesions, such as perifollicular hæmorrhages or follicular hyperkeratosis, a convenient instrument is an illuminating magnifier such as philatelists and threadprovers use; a glossoscope should have a magnifying power of 10 to 20, and the papillæ should be in focus if a microscope slide is interposed between the tongue and the lens. Corneal vascularization cannot be seen properly without a slit-lamp microscope; the attribution of conjunctivitis or circumcorneal injection to deficiency of riboflavin is erroneous. Those few practitioners who possess a slit-lamp microscope will find it a most useful tool for the clinical diagnosis of early nutritional deficiency. The skin over the triceps, which is one of the first regions to develop follicular hyperkeratosis, is easily inspected if the patient stands with his back to the instrument and rests his elbow in the chin-rest. For inspection of the limbus of the eye, the slit should be opened slightly, and the vessels inspected by reflected light. This is greatly helped by the use of polarized light, produced by placing a disc of polaroid over the lens that focuses the slit. Singly polarized light makes the definition of the scleral-conjunctival margin very sharp, and also assists the appreciation of conjunctival opacity; doubly polarized light, with the second polarizer on the objectives of the microscope, enhances the effect but makes the retro-illumination of the vessels too dim.

It is often desirable, though difficult, to follow carefully the effects of therapy upon specific lesions. Photography is useful for many purposes, particularly for showing the location and general distribution of a lesion. Prints of the tongue, to show denudation of the papillæ or fissures, are easily made by Isaac's and Oatway's method of drying the tongue, placing smoked paper upon it (which itself

obtains a negative impression) and then placing upon the tongue a card soaked in shellac and nearly dry. Similarly, excellent records of follicular hyperkeratosis, pityriasis sicca (see below), angular stomatitis and other skin lesions can be obtained by applying finger-print black lightly to the area and making an impression on a piece of paper. An even better and cleaner method, suggested to me by Supt. F. Cherrill of New Scotland Yard, is to put a thin layer of linseed oil over the part, make an impression on paper and then dust graphite powder over the paper. This simple method records such skin lesions better, and more quickly, than can be done easily by photography.

THE SKIN

Epithelial cells, in particular those of the epidermis, seem to be more easily affected by deficiency of different nutrients than are other cells. Poor nutrition of the cells of the epidermis, such as can be produced by vascular disorders of the limbs, causes the skin to be thin, dry, smooth and therefore shiny. Such skin, described as "atrophic" and most commonly seen over the shins, occurs in malnourished persons, but is not known to be curable by administration of any single nutrient.

Generalized xerosis of the skin, which is usually due to diminished secretion of sebum, occurs in deficiency of vitamin A and probably also of fat; it tends to be most marked over the forearms, but must be distinguished from dryness caused by exposure or frequent washing. Ichthyosis has been claimed to be due to an hereditary disorder in the metabolism of vitamin A (Rapaport, Herman and Lehman, 1942) but our observations do not support this. A fine, branny desquamation of the skin, usually of the shins, occurs particularly amongst the poorer classes in this country; such desquamation has been produced in man by deficiency of biotin (Sydenstricker, et al., 1942), but this can only be produced on unusual diets.

Pityriasis sicca of the face, which is the name given to dry, scaly, erythematous patches, particularly in children, occurs usually below the angles of the mouth or on the cheeks; the patches may crack and bleed. The condition, which seems to occur more commonly amongst malnourished children, is also common amongst those subjected to dirt and exposure, and in particular to the accumulation of tears and saliva on the face. It is not cured by yeast.

In *pellagra*, various dermatoses that are cured by niacin occur. In acute deficiency the first visible change is erythema, which resembles sunburn and occurs in areas subjected to mild trauma, as by light, tight clothing or mechanical irritation; it is sharply localized. Later, vesicles or bullæ may appear on the erythematous areas; there may be decubitus ulcers and necrosis. The skin, particularly of the shins, may be heavily pigmented and cracked, giving the appearance of crazy paving. In chronic deficiency there may be thickening of the skin over bony prominences, due to generalized hyperkeratosis; this can occur without any pigmentation and is most frequently found over the knuckles, knees, elbows, around the ankles, and over the palms of the hands and soles of the feet. It responds with surprising rapidity to treatment with niacin.

In deficiency of riboflavin there is a wet *seborrhœic dermatitis* which affects particularly muco-cutaneous junctions (Sydenstricker, 1941). The earliest area to be thus affected is the corners of the mouth, where radial cracks appear—"angular stomatitis"; these may extend on to the che · n⌐-become infected, particularly

active circulation in the dilated capillaries, and so the atrophic tongue is scarlet; it is sore and may also be dry. Earlier in the condition the tongue is red, swollen, tender and the papillæ engorged. In deficiency of riboflavin the tongue is usually normal in colour but may be magenta, owing to the blood in the dilated and proliferated minute vessels being venous; the filiform papillæ are swollen and rounded, giving a "cobblestone" appearance to the tongue, which may be painful and fissured. In deficiency of riboflavin the lingual signs are probably the first to appear; they closely resemble the raspberry tongue of scarlatina. In pernicious anæmia the tongue is red, atrophic and painful; it responds to liver therapy. A similar appearance is found in sprue, idiopathic steatorrhœa, cœliac disease, myxœdema and many subjects with achlorhydria. Deficiency of iron causes glossitis which is cured by the administration of iron alone (Waldenström and Hallen, 1938). A dry and shrivelled appearance of the tongue is a good indication of deficiency of water; mouth breathing will cause dryness alone. Deep fissuring of the tongue occurs as a congenital anomaly and gives to the tongue the appearance of a contracted scrotum. It and the geographical tongue have no connexion with nutritional disorders. In diagnosis, other conditions affecting the tongue must be remembered: the most common cause in this country of a smooth tongue is an upper denture; ulcers along the sides of the tongue are frequently caused by dental snags; red hypertrophied fungiform papillæ of the tip of the tongue can be caused by excessive smoking, hot food or spices, and this area is so easily affected by such extraneous factors that its appearance should be interpreted with caution.

The gums can also be affected by many factors other than nutrition. The normal gum is firm, pink, papillated, with a pitted surface like orange peel; the papillæ withstand a pressure of 1 kgm. on 7 sq. mm. (10 atmospheres per sq. inch) without pain or bleeding. Deficiency of vitamin C combined with trauma causes scorbutic gingivitis: the gums are hypertrophied, congested and therefore purple, tender, and bleed readily. There are other causes of gingivitis. Hypertrophy is caused by œstrogens, and therefore can occur during pregnancy or even menstruation (Ziskin, 1938); tartar, malocclusion, mouth breathing, or poor oral hygiene can cause gingivitis even when vitamin C is lavishly administered. Claims have been advanced for the therapeutic efficacy of vitamin C and of niacin in the treatment of Vincent's angina (King, 1943), but these are not fully substantiated.

The gastro-intestinal tract is more important in causing nutritional deficiencies than in being affected by them. Thiamin deficiency causes anorexia, and niacin deficiency causes achlorhydria; both states are quickly relieved by the appropriate therapy. Niacin deficiency also causes degenerative changes in the intestine, accompanied by diarrhœa. Achlorhydria from any cause diminishes the absorption, or facilitates the destruction, of certain nutrients, particularly iron, vitamin C, thiamin and niacin. Certain nutrients, such as vitamin K and biotin, are normally synthesized by bacteria in the gut, and in diarrhœa, or following resection or administration of sulphaguanidine, this synthesis may be prevented and deficiency may occur. Ulcerative colitis is often accompanied by deficiency of niacin producing erythema of the skin of the forearm and subsequently other manifestations. Fat-soluble vitamins tend not to be absorbed when steatorrhœa occurs; and vitamin K, in particular, is scarcely absorbed when bile salts are absent from the gut, as in obstructive jaundice.

CARDIOVASCULAR SYSTEM

Mention has already been made of acute cardiac beri-beri and of wet beri-beri. The œdema of the latter is probably due to increased permeability of the capillaries caused by the accumulation of a metabolite, pyruvic acid, in the blood. The œdema differs from famine œdema, which is caused by dietary deficiency of protein and is accompanied by low values for serum protein. Moreover, the limbs in wet beri-beri are pink and warm, and the circulation time is decreased. Other factors affecting the capillaries in the skin have already been mentioned.

NERVOUS SYSTEM

Thiamin is necessary for the nutrition not only of cardiac muscle cells but also of brain cells; in deficiency they are unable to oxidize sugar to carbon dioxide, and pyruvic acid accumulates (Peters, 1936). This acid may cause local dilatation of capillaries and hæmorrhages, particularly in the pons, producing Wernicke's encephalopathy (Swank and Prados, 1942). Derangement of the metabolism of cells in the cord produces degeneration of the motor and sensory nerve fibres, which starts distally and proceeds centrally; an ascending peripheral neuritis therefore occurs in thiamin deficiency, particularly when chronic, and this is accompanied by marked tenderness of the calf muscles. Encephalopathic states also occur which respond dramatically to niacin, and they can simulate neuroses and most of the well-known functional, toxic and organic psychoses. An admirable summary of these by Sydenstricker (1943) renders further description unnecessary here. The neuropathies have been described elsewhere (Sinclair, 1943). ·

THE EYES

The epithelial cells of the eye, like those of the epidermis and of the tongue, are markedly affected by certain nutritional deficiencies. In deficiency of vitamin A there is degeneration of the epithelial cells of the sclera, giving rise to *Bitôt's spots*. These are very characteristic lesions situated in both eyes just outside the limbus in the equatorial plane, nasal or temporal or both. The spot is quite superficial, chalky white, not wetted by tears, and usually has a foamy surface. Although such deficiency is the most common cause of Bitôt's spots, they are not always due to nutritional deficiency: I have had the opportunity of studying in detail two cases that were not, and probably had not been, accompanied by any deficiency of vitamin A. There are two conjunctival lesions that are quite distinct from Bitôt's spots: *pinqueculæ* and *pterygia*. The former are common, being almost universal in the population over the age of sixty years. They are slightly yellowish and fatty in appearance, occur in the equatorial plane, usually nasal at first and then temporal as well, and raise over them the epithelium which is wetted by tears. They are due to yellow elastic fibre proliferation and degeneration of the fibrous tissue in the substantia propria beneath the epithelium, and are certainly not caused by nutritional deficiency. A true pterygium starts with small vesicles in the cornea, just inside the limbus on the nasal side in the equatorial plane; the epithelial cells of the conjunctiva then proliferate and grow on to the cornea, eventually covering it with a wing-like fold. The condition is rare in this country but common in dry, dusty places and in northern Canada; probably it is caused by exposure and has no nutritional basis. These localized changes are different from *xerosis conjunctivæ* which, like keratomalacia, is produced by deficiency of vitamin A. In *x*·., conjunctivæ there is first a loss of lustre of the scleral conjunctiva, then gener·

CERVICAL DISCHARGE

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Vaginal discharge may be physiological—an excess of the normal cervical secretion—or pathological.

PHYSIOLOGICAL CAUSES

Physiological causes may easily be overlooked unless the possibility is borne in mind. Some women experience slight discharge at the time of ovulation. It may even be blood stained. Others experience discharge pre-menstrually.

When a patient complains of an intermittent white discharge, she should be asked to keep a careful record of the days of discharge in relation to the period. If shown to be physiological, it may then be possible for the practitioner to reassure the patient regarding the harmlessness of its nature.

Women who practice birth control by the method of coitus interruptus, may cause such a state of congestion in their pelvic organs that excessive secretion of the cervical glands results. Masturbation may similarly lead to congestion and excessive glandular activity. Psychological sexual stimulation may have a similar effect. Such stimuli may, for example, be produced by reading pornographic literature or be experienced during the period of "walking out."

At puberty, before the function of the glands is properly regulated, cervical glandular activity may be excessive. Pregnancy is accompanied by an increased flow of cervical mucus.

Leucorrhœa is the name given to the above excessive but non-pathogenic discharge.

Character of the physiological discharge.—The physiological discharge is white or cream, albuminous in nature and forms a starch-like deposit on the underclothes, which can be rubbed off. There is, as a rule, no vaginal soreness or irritation, unless leucorrhœa is accompanying some other condition.

Treatment.—Congestion should be relieved by the avoidance of very hot baths and by combating constipation. Sexual stimuli of any kind should be avoided as much as possible. Instruction in a more suitable method of birth control should be given to those patients who practice coitus interruptus. Little can be done to lessen the physiological discharge of pregnancy.

PATHOLOGICAL CAUSES

(1) *DUE TO RETAINED FOREIGN BODIES.*—Careful manual examination and examination of the vagina through a speculum should be made to ascertain that no ring, tampon or other foreign body has been inadvertently retained.

I can recall a case in which a vulcanite ring was retained for twenty years. The old lady, by this time long post-menopausal, had developed vaginal atresia and the pessary had to be removed in halves with rib-shears! There was non-malignant ulceration of the vaginal vault which was the cause of the discharge.

Some persons cannot tolerate the ordinary rubber ring. If a pessary is necessary in such cases, a porcelain one should be tried. Up to the time of the menopause it is necessary for those persons wearing a ring to syringe three or more times a week, as may be found necessary. After the menopause, however, it is not always necessary to douche; many persons can wear a ring comfortably, with no injury to the vagina, without douching. A ring should be changed every two to three months, and the vagina inspected on its removal. A ring that has become crinkled and uneven may cause pressure on the vaginal walls and set up inflammation. In such cases, the ring must be left out for a few days before re-insertion.

(2) *OF CHEMICAL ORIGIN.*—The patient should be interrogated concerning what method of birth control she practices, if any, and what contraceptive medium is being used. Some of the unorthodox chemical preparations are of an irritant nature, but to some persons even the well-known and advocated chemical contraceptives may prove intolerant to the vagina. In these cases an alternative preparation should be tried.

Inquiry should be made to ascertain that the woman is not using a too strong antiseptic douche.

(3) *OF BACTERIOLOGICAL ORIGIN: VAGINAL CAUSES.*—*Trichomonas vaginalis* is a flagellate protozoa which is active at a pH of about 6. (Normal vaginal pH is 4·5.) It causes an inflammatory reaction in the vagina. An acute infection may simulate gonorrhœa. Soreness may be so extreme as to prevent the passage of a speculum.

Two vaginal swabs should be taken in all cases of vaginal infection: (1) from the posterior fornix, mixed with 1 c.cm. of normal saline; (2) from the outside of the cervix or posterior vaginal fornix. They should be delivered immediately to the pathological laboratory for examination, fresh, and for staining and culture. If it is impossible to deliver them to the laboratory without delay, a smear should be made on a slide and the slide fixed. A second sterile swab should be sent in a test tube for culture.

Usually trichomonas infection is of a chronic nature, and the discharge, with or without the addition of irritation, the only complaint. The discharge from a trichomonas infection is thin, frothy, greyish in colour, mainly concentrated in the posterior fornix. In acute conditions there is a punctate inflammatory reddening of the vaginal walls, but in chronic cases there may be little or no changes. As a rule, there is increased redness of the posterior fornix. When the trichomonas accompanies other infections the above description is modified.

Treatment.—The fact that so many different treatments are recommended is an indication of the non-reliability of any one method. Arsenical preparations may bring about a cure. Instructions are given to insert two tablets of stovarsol vaginal compound into the vagina nightly, as high up as possible, and not to get out of bed until the morning. Treatment should be continued for three weeks. If after a few days interval it is found that the discharge has not ceased, the treatment should be resumed for a further three weeks. In any case it is wise to insert the tablets for a few days after the first two or three periods following the completion of the course.

yellow, but there is no clear-cut difference and only the microscope or a complement-fixation test to exclude the presence of the gonococcus can really determine its nature. All cervical infections are associated with a muco-purulent discharge. Other complications, such as an erosion, a tear or a patulous cervix, may coexist.

Treatment: Cauterization of an accompanying erosion, repair of a torn or very patulous cervix may cure the cervicitis. A chronically infected cervix, with no erosion or tear, but showing Nabothian cysts on the surface, may be treated with the cautery needle. The cysts are punctured, the mucus wiped away with a swab dipped in potassium hydroxide solution, and the cervical canal and cervical portion of the cervix painted with 10 per cent. protargol. Astringent douches of zinc sulphate or powdered alum, 60 to 120 grains to a pint, are given twice daily for fourteen days.

Should the above treatment not bring about improvement, ionization may be tried. Using a speculum, a gauze pack, soaked in a 1 per cent. solution of zinc sulphate, is wrapped around a vaginal electrode and inserted into the vaginal vault. The second electrode is applied to the abdomen. On removal of the speculum a 5 m.a. constant current is turned on and treatment continued for twenty to thirty minutes. The above treatment can usually be obtained at a recognized physiotherapy department.

CARCINOMA

The discharge is almost always blood stained. In fact, the first complaint is usually of bleeding on sexual intercourse. As the growth increases in size, the discharge becomes purulent and later offensive.

The diagnosis can usually be made from the feel. The affected area is hard, friable and tends to bleed on palpation.

Treatment is given at a radiotherapeutic clinic.

UTERINE CAUSES

Unless the cervix and vagina are inspected through a speculum it is difficult to diagnose a discharge of uterine origin. If, however, clean vaginal walls and a healthy cervix are found, the discharge in all probability comes from the uterus. Pus may be seen in the process of extrusion from the cervical os.

A *pyometra* may be due to an endocervical carcinoma, carcinoma of the fundus, or be the result of a chronic endometritis. Palpation will reveal a barrel-shaped cervix in the case of an endocervical carcinoma. If a pyometra is present, the uterus will probably feel larger and softer than usual. Diagnosis will require confirmation under anæsthesia, with the assistance of microscopic examination of the discharge or a biopsy.

A *chronic endometritis* may be the late sequel to a gonococcal infection or follow a previous puerperal infection. Retroversion of the uterus may account for the failure of the infection to drain away in the early stages.

Dilatation of the cervix under anæsthesia, with correction of the malposition, may cure the pyometra, but a recurrence of symptoms would indicate the need for more radical treatment, i.e., a panhysterectomy.

CHILD HEALTH
XII.—TUBERCULOSIS IN CHILDHOOD
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CHILDHOOD tuberculosis is a subject of importance, both in public health and pædiatrics. That it looms less largely in the former sphere than in the latter is probably due to a doubt amongst many workers in preventive medicine as to the importance of finding and treating cases of primary or first infection. When this leads to obvious disease of glands, abdomen or bones and joints, the need for treatment is, of course, recognized, but primary tuberculosis of the chest (where the first focus occurs in 90 per cent. of cases) is, it is argued, overcome without perceptible upset, in the great majority of people. I am in the opposite camp, amongst those who believe that primary tuberculosis is one of the important problems in the maintenance of child health.

INCIDENCE AND MODE OF ONSET

Put briefly, the general picture is as follows. The incidence varies with locality and nationality, but by the age of sixteen about 75 per cent. of those living in a large town in England will have become tuberculin positive. Their first infection most often will have passed unnoticed, although it has probably not been symptomless. A small proportion will have endured complications, specific or non-specific, and a much lower percentage will have developed, or be destined to develop, the adult form of pulmonary tuberculosis. Prior to this age there will have been fatalities, in most cases from tuberculous meningitis, and this commonly before the age of three years. The admission of the bacillus to the body will have usually occurred from inhalation of infected droplets of sputum, but the buccal cavity or intestine may have been infected by ingestion of contaminated material (usually milk). Whatever the route, the first lesion will have been a primary focus, manifest, with the development of allergy, after an incubation period of three to eight weeks, with subsequent enlargement of the lymphatic glands draining the organ which is first involved. These combined lesions (the primary complex) may have resolved completely or may have left radiological signs.
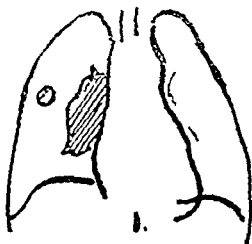
FIG. 1. J.B., aged eight years. Admitted 15.4.41, finally discharged 17.10.43. Shows large caseous hilar glands and primary focus (P.F.). Child developed erythema nodosum in July 1942.

PRIMARY TUBERCULOSIS IN THE CHEST

The primary focus is usually single and confined to one lung. It may be visible radiologically (fig. 1). Following the incubation period, the child becomes allergic to tuberculin, usually in high dilution, has a period of initial fever and may show symptoms of malaise, cough or failure to put on weight. Erythema nodosum may

mediastinum, which may hide moderately enlarged glands. A lateral picture shows hilar glands (seldom paratracheal) and assists in localizing parenchymal shadows, especially those of atelectasis or interlobar effusion (fig. 5 and 5a). It should be remembered that enlarged glands occur in measles, pertussis and after broncho-pneumonia, and lung shadows accompany catarrhal and pneumonic infections.
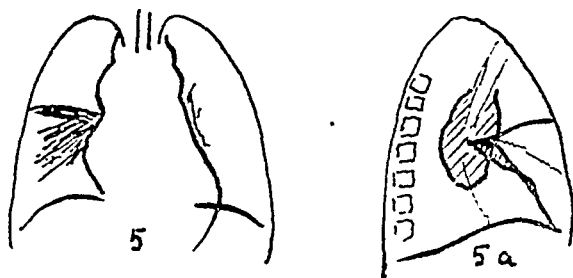
FIG. 5 and 5a. P.B., aged two years and three months. Shows enlarged hilar and paratracheal glands with parenchymal shadows, shown on lateral to be due to thickened septa major and minor.

Examination of stomach washings or faeces for tubercle bacilli may prove positive (more likely if injected into a guinea-pig) even in an uncomplicated primary complex, and this will, of course, clinch the diagnosis.

The erythrocyte sedimentation rate is of greater value as a prognostic than as a diagnostic test, but, if raised, it adds another item to the general picture.

Finally, history of contact with a tuberculous adult is of paramount importance.

Approximately half the diagnosed cases come through tuberculosis officers and the remainder from general or special hospitals, especially those which have units for children's diseases. The former, for the most part, are contacts of known open cases, the latter, those children whose symptoms have led their parents to seek advice. There is no reason why the tuberculin test should not be more often used by general practitioners to eliminate tuberculosis in the young child. Accurate diagnosis must, however, be the task of a specialist, whether in a tuberculosis dispensary or pædiatric unit.

PROGNOSIS AND TREATMENT.—What the life history of the diagnosed primary infection will be rather depends upon the age of the patient. The older the child the more likely is it to show only moderately enlarged glands, with or without a perceptible focus, which diminish in size over a period of months, without any complication and without any obvious general disturbance. If all the undiagnosed cases are included, such indeed must constitute the great majority. On the other hand, in the young child especially, there may be a definite illness, lasting perhaps one or two years, during which there is general disturbance and failure of large caseous glands to become smaller or to calcify, whilst a complication such as an effusion or atelectasis may occur months after the onset of the disease, which may, indeed, find an end in generalized miliary tuberculosis or meningitis. This type also seems more apt to develop catarrhal infections, whilst the severer exanthemas will cause aggravation of the tuberculous condition. Phlyctenular conjunctivitis may be an additional complication during the illness. Bone and joint disease sometimes develop in these younger children, and in them seems especially hard to control, but this is a more common occurrence in the years of school life.

At the other end of the age scale, primary tuberculosis may be the immediate precursor to the adult type of pulmonary tuberculosis. The proportion of such cases

is probably small, but occasionally, in the adolescent, parenchymatous infiltration of that type appears before the enlarged glands have become quiescent (fig. 6). How often the adult form of disease results from a "spill-over" from incompletely healed hæmic foci it is impossible to say, but this" endogenous" method of super-infection undoubtedly can occur (fig. 7 and 7a). The work of Sweany (1941, 1943) is of great interest in this connexion—"Enough people retain bacilli to account for a large number of our active cases of tuberculosis that matures like any crop of biological units a few months or years after seeding!"
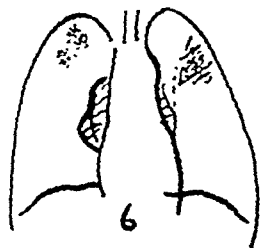
FIG. 6. N.O'C., aged four-teen years. Admitted 21.3.44; still in hospital. Shows enlarged hilar glands, with post-primary infiltration in both lungs. Sputum T.B. + on one occasion.

According to Wallgren (1939) "Pleurisy appears to be an episode in the course of tuberculosis without any prognostic significance." Although this is probably true of younger children, its occurrence in adolescence should be regarded as having the same significance as it would in a young adult.

Young children recovered from a severe first infection seem to be more liable to catarrhal illnesses. Bronchiectasis tends to occur in an unexpanded collapse, and there is reason to believe that it may sometimes ensue in a lobe which has recovered or in an area of "epituberculosis" which has resolved.

It is important that all child contacts in tuberculous families, and children coming to hospital with doubtful symptoms, should be reviewed with tuberculosis in mind. In the first group the source is obvious, in the second it may be traceable. In the present state of knowledge it is believed that it is fundamental not to expose already infected children to infection from an open case of
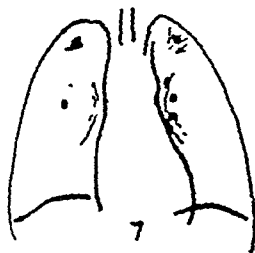
FIG. 7. R.G., aged fifteen years. Admitted 27.10.42; discharged 2.11.43. Shows calcified P.F. glands and hæmic foci, with suspicion of post-primary disease at left apex. First treated for tuberculous hip in 1934, but had been in hospital and a boys' colony ever since.
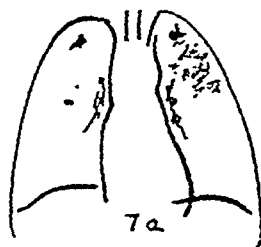
FIG. 7a. R.G. Further spread of disease. Treated by artificial pneumothorax.

pulmonary tuberculosis. If that be secured and the home conditions are otherwise good, many cases of primary infection may be treated at home under the supervision of the family practitioner and the tuberculosis officer, with insistence on adequate amounts of rest, fresh air and food. Those whose home conditions are bad, young children, very active or complicated cases and adolescents with pleural effusion, are better off in a special institution, with hospital school attached and quite separate from an adult sanatorium. In such a hospital or preventorium the routine will be that of a sanatorium; although bed rest can be only comparative in the case of children, it should be maintained until the X-ray picture shows quiescence, the erythrocyte sedimentation rate and temperature have been

TUBERCULOUS MENINGITIS

This, the greatest danger in primary tuberculosis of childhood, requires further mention. As the only possible treatment is prophylactic, the following points are important:—

(1) Although more frequent in the under-five age-group, it may occur at any age.

(2) Although the first three months of infection are most dangerous, hæmatogenous spread can occur whilst the disease process remains active.

(3) If it occur soon after the end of the incubation period, radiological signs in the chest may be inconspicuous.

(4) A proportion of cases arise from primary abdominal (i.e. bovine) infection and thus the latter is far from benign in the young child, as was shown by Engel and his colleagues (1938).

(5) The child living in the same house as an even intermittently "open" tuberculous adult is in a hazardous environment.

Morals can be drawn from these facts, perhaps the most practical being that young children and unarrested tuberculous adults must be separated, that raw milk is dangerous, but also that the tuberculin test should be part of the armamentarium of the medical practitioner working amongst toddlers, whether in nursery, school or clinic.

CONCLUSION

The following figures taken from "The Health of the School Child" for 1938 give an idea of the killing power of tuberculosis in childhood. They will have altered for the worse since that year:—

England and Wales: Deaths from Principal Causes 1938

	Under 15	0—5	5—10	10—15
Tuberculosis of the nervous system	1273	820	275	178
Abdominal tuberculosis	199	137	33	29
Other forms of tuberculosis	878	420	160	298

But to keep a sense of proportion it should be remembered that in the same year deaths from respiratory tuberculosis, the vast majority among those over the age of fifteen, totalled more than 23,000.

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NOTES AND QUERIES

TESTOSTERONE IN STERILITY

QUESTION (from a practitioner in Rhodesia).—A young, vigorous married male, aged twenty-seven, is sterile. His wife has been fully investigated and found to be normal There is no history of mumps or gonorrhœa. Spermatozoa tests persistently show 50 per cent. motility after examination half-an-hour after collection of specimen. What treatment, hormonal, thyroid, or such like, may help to raise the number of motile spermatozoa to about 75 per cent, the necessary minimum for conception?

REPLY.—I assume that the specimen of semen was not obtained by wearing a rubber sheath, because traces of chemicals in a sheath interfere with motility. The best treatment of poor motility and viability is by testosterone This increases the activity of the accessory sex glands, amongst which are the epididymes. Spermatozoa reach maturity in these glands. By far the best preparation of testosterone is an emulsion of crystals of methyl testosterone By giving this into a muscle a deposit is formed from which hormone is continually absorbed A preparation of this kind is now being put on the market by Messrs Coates & Cooper, under the name of "micryston testosterone" Although poor motility and viability must be regarded as being unfavourable factors, it cannot be stated that a 75 per cent. motility is a necessary minimum for conception Conception has occurred with semen below this level.

KENNETH WALKER, F R C S.

DIGITALIS IN AURICULAR FIBRILLATION COMPLICATED BY CEREBRAL EMBOLISM

QUESTION (from a practitioner in Cyprus) —In a case with cerebral embolism with hemiplegia, and due to mitral stenosis with irregular rhythm, can digitalis be administered if there is heart failure? or do you think that this will increase the danger of a new embolism?

REPLY (from a cardiologist) —The presence of cerebral embolism is no contraindication to the use of digitalis in a patient with auricular fibrillation and heart failure There is some evidence suggesting that digitalis may have a thromboplastic action, and the theory has been propounded that it is this action of digitalis that is responsible for the embolic phenomena that occur in patients with auricular fibrillation The clinical evidence in favour of this theory is far from convincing, and does not affect the sound rule that digitalis should be given to every patient with auricular fibrillation and heart failure

BARIUM SULPHIDE IN HIRSUTIES

WITH reference to the note on this subject in a recent issue (*The Practitioner*, **154**, 187) a physician writes —I have prescribed baryta sulphurata (barium sulphide) with success for years for the removal of superfluous hairs on lip and chin, and have found it most effectual. Unfortunately its use requires caution, and it is not a permanent cure, as the applications have to be repeated at intervals of from about one to three weeks, according to the individual, for the growth reappears. Two most important points have to be complied with· it must be diluted before applying, it must be left on the skin for a limited time only. It is when the barium sulphide is used undiluted, or left on too long, that dermatitis occurs The procedure recommended is·—

Mix one part barium sulphide with three parts talc (or other dusting powder) on a slab, with a broad paper-knife (celluloid), add water q s to make a thin paste, spread over the hairy parts in a thin layer, allow to remain on the skin for *three* minutes only to begin with (with prolonged use the time can be extended to 5, 8, or 10 minutes, according to the sensitiveness of the patient's skin), remove with soap and warm water and a face cloth, wash off finally with warm water only, dry well with a soft towel As there will be a strong odour the room needs to be well aired after treatment

VAGOTONIA AND ANGINA OF EFFORT

QUESTION (from a subscriber in Essex).—I shall be grateful if you can kindly enlighten me as to —(1) What does the term "vagotonic" with reference to coronary circulation denote? (2) Should a person expertly declared as "vagotonic" and generally hypotonic suffer from classical symptoms of "angina of effort," and how does the mechanism work? (3) Is it not conceivable that such a person suffering constantly from typical angina of effort—for a long time, say for about ten years—(exclusively to being vagotonic, all other causes having been definitely eliminated) would have his myocardium damaged, at least to some extent, and could it be said about him after such a length of time that he has a good insurable heart? (4) Is it a common complaint or a rare one? In either case, where could I find a detailed description of this syndrome, as in standard books on medicine I find no reference to it at all

REPLY —(1) Vagotonic, as applied to the coronary circulation, is a term which has no meaning. (2) The individual in whom the vagus is overactive usually does not suffer from angina of effort Sympathetic stimulation, emotionally, by exercise, or by adrenaline and ephedrine, characteristically brings into prominence angina of effort due to a coronary lesion (3) Angina of effort is caused by organic change in the coronary arterial system Such change renders a heart no longer a "good insurable heart " There is no such term as vagotonic angina Angina of effort, as such, was described in a paper by Bourne and Bodley Scott (*Brit med J*, 1938, **I**, 55)

GEOFFREY BOURNE, M D , F R.C.P.

PRACTICAL NOTES

TESTOSTERONE PROPIONATE IN THE TREATMENT OF THYROTOXICOSIS

As three of the characteristic effects of thyrotoxicosis—increased urinary excretion of nitrogen and of creatin, and a fall in weight—are antagonized by testosterone propionate, L. W. Kinsell, S. Hertz, and E. C. Reifenstein, Jun. (*Journal of Clinical Investigation*, November 1944, 23, 880) have investigated the effect of testosterone propionate and of methyl testosterone in three patients with thyrotoxicosis (2 women and 1 man). Testosterone propionate induced a positive nitrogen balance and caused a gain in weight; methyl testosterone had a similar initial effect on nitrogen balance, but this was not sustained. The hypercreatinuria of thyrotoxicosis was decreased by testosterone propionate but increased by methyl testosterone. Testosterone propionate improved the clinical condition of the patients, but methyl testosterone aggravated their condition. In view of these findings it is suggested that testosterone propionate may prove of value as part of the pre-operative treatment of thyrotoxicosis in patients who are markedly emaciated. The recommended dose is 12·5 mgm. daily. As testosterone propionate has no significant effect upon the basal metabolic rate, it would probably be advisable to administer iodine (or thiouracil) at the same time. The main benefit of testosterone propionate would be to prevent the liver damage which is found in fatal or severe cases of thyrotoxicosis; this damage it would prevent or ameliorate by causing a replacement of the depleted protein stores of the liver.

SULPHADIAZINE IN THE PROPHYLAXIS OF RESPIRATORY DISEASE

IN view of the high incidence of epidemic respiratory disease at an Army Air Force technical school during the winter of 1942–43 and January 1944, a trial was made with sulphadiazine as a prophylactic throughout the months of February and March 1944. The results, which were decided on the basis of hospital admissions, are recorded by Capt. R. G. Hodges (*New England Journal of Medicine*, December 21, 1944, 231, 817). On February 2, 3 and 4, 1944, members of the teaching staff (group A) received 2 gm. sulphadiazine daily. The admission rate fell promptly, and remained between one-third and one-half that of a control group. Equally striking results followed the administration of the same dosage to group B on February 18 and 19, but the lowered incidence was maintained for a shorter period, four days only. On March 7, 1944, members of group B began taking 1 gm. sulphadiazine daily; and on March 15 and 16, 1944, the members of the first group (A) received 2 gm. daily; admissions from both groups fell sharply. The most striking prophylactic results were obtained in streptococcal infections (sore throat or follicular tonsillitis) the drug reducing the incidence to almost zero. There was also a striking reduction in the incidence of scarlet fever. As regards lobar pneumonia: in the first group the number of admissions from January 20 to February 2 1944, was 35, whereas between March 8 and 19, the number of admissions was only 12. Equally striking results were obtained in the second group, the figures for the same periods being 21 and 6 respectively. A reduced incidence of acute rheumatic fever was also noted. A variety of dosages were used, and the author states that the optimal dose for a given group should be worked out individually. No serious, untoward reactions occurred, and it was noted that patients with pneumococcal pneumonia, who had received sulphadiazine prophylactically, responded just as well to the drug during treatment.

DATURA POISONING

AN editorial annotation draws attention to three articles on poisoning by *Datura stramonium*, by T. Farnworth Anderson, F. H. Henderson Begg, and F. Manaughton; by W. D. Raymond, and by F. J. Wright (*East African Medical Journal*, December 1944, 21, 355, 362 and 365) and the increased incidence of stramonium poisoning in Kenya and Tanganyika during the past fifteen months. The *Datura* is a poisonous weed which grows amongst wheat and rye and in harvesting is often garnered concomitantly. It contains three alkaloids, i.e., lævo-hyoscyamine, atropine and hyoscine or scopolamine, all three of which are powerful drugs and lethal at dosage of 1 grain or more for adults and 1/6 grain for children. Owing to the shortage of maize during the past two years, a mixed meal, consisting of maize diluted with wheat, rye or cassava, has been used in Africa; also, owing to the limited milling capacities whereby the wheat and rye are cleansed of *Datura* before use, the bread has been made up in mills lacking the machinery for cleansing. The symptoms are those of atropine poisoning, or they may be confused with ergot poisoning, and consist of dryness of the mouth and throat, nervous and mental symptoms, visual symptoms and abdominal disturbances. *Treatment form-*

erly consisted of emptying out the stomach and general restoratives, but recently prostigmin in dosage of 0·5 to 1 mgm. has been recommended. Fatal cases are rare, and in the first article of the series, which records two outbreaks among African troops, totalling 1,524 cases, recovery in almost every instance was complete in twelve to twenty-four hours.

THE EFFECT OF VITAMIN E ON IMPAIRED KIDNEY FUNCTION

A PRELIMINARY report of the results obtained by the administration of vitamin E (ephynal-synthetic *a*-tocopherol) to thirteen women suffering either from chronic nephritis or impaired renal function, such as chronic œdema not of cardiac origin, or hypertension, is given by E. Shute (*Canadian Medical Association Journal*, February 1945, 52, 151). Some of the cases were post-puerperal, the pregnancy having been complicated by toxæmia. As a rule, two separate tests for kidney function were made before the institution of treatment, which consisted of the administration of 25 mgm. ephynal daily, for two weeks. At the end of this time the two-hour test was repeated in order to assess improvement. Benefit was obtained in ten of the thirteen cases treated: the improvement developed quickly but was transient unless therapy was continued, and, in most cases, it was limited to the tubular system of the kidney. In addition to the cases referred to above, a man of forty-three, with a blood pressure of 180/100 mm. Hg, severe albuminuria and œdema, was given one tablespoonful of Kelly's wheat germ oil per day. After seventeen days of this treatment the albuminuria was halved and the blood pressure was 150/80 mm. Hg. Two months later the blood pressure had fallen to 137/75 mm. Hg, the œdema had disappeared, and there was a decrease in weight. Three months later the wheat germ oil was reduced to one desertspoonful daily. The improvement continued, and nine months later, i.e., fifteen months after the institution of treatment, the vitamin E therapy was discontinued. One year later the albuminuria was one plus, and five months later there was only a faint trace of albumin present. The author states that the results obtained in this case may indicate a rôle for vitamin E therapy in the treatment of nephrosis.

GAMMA GLOBULIN IN THE PROPHYLAXIS OF MEASLES

A STUDY has been carried out by M. Greenberg, S. Frant, and D. D. Rutstein (*Journal of the American Medical Association*, December 9, 1944, 126, 944) to determine the comparative effectiveness of gamma globulin (human immune serum globulin) and placental globulin. Two groups of contacts between the ages of six months and six years were used for the investigation. Gamma globulin, in a solution of twenty-five times that of pooled adult serum, was injected in dosage of 2 c.cm. (the total contents of the vial) in all cases, regardless of age; the placental globulin was given in dosage of 5 c.cm. (1 vial) likewise to all contacts. The group receiving gamma globulin numbered 814, and those receiving placental globulin totalled 90. In the first group, i.e., those receiving gamma globulin, 78·7 per cent. did not develop measles, 19·7 per cent. developed mild measles, and 1·6 per cent. moderate measles. There was no case of severe measles in this group. In the group of contacts receiving placental globulin 38·9 per cent. did not develop measles, 26·6 per cent. developed mild measles, 11·1 per cent. developed moderate measles, and 23·3 per cent. developed severe measles. The figure for reactions in the gamma globulin treated group was less than 1 per cent. (seven cases: two of fever following the injection and five local reactions). In the placental globulin treated group, however, reactions occurred in 41 per cent. of cases (total 37: 18 general and 23 local). In a control group of 65 contacts who received no prophylactic treatment, 83 per cent. developed measles, 31 per cent. being severe. On the basis of these findings the authors state that gamma globulin is the material of choice in the prophylaxis of measles. A tendency for the effectiveness to decrease with age was noted, but complete protection was in no way affected by the day of exposure on which the injection was made, from the third to the eighth day after exposure to the original case.

A NEW INSECTICIDE

FOR some time chemists have been searching for easily synthesized substances to use as substitutes for pyrethrum and derris, and it would seem that gammexane, described by Dr. Rowland Slade in a lecture before the Liverpool Section of the Society of Chemical Industries, is likely to fill the need. A description of tests carried out at the I.C.I. laboratories is given in the *Pharmaceutical Journal*, March 17, 1945, 154, 138. Gammexane is benezene hexachloride, the *gamma* isomer of which was found to be more toxic to weevils than any other substances previously tested in the laboratories. A concentrated solution was prepared which, on addition of water, gave a stable emulsion suitable for use in the field. The tests showed that the preparation was more toxic in locust baits than anything so far used; it also proved effective against wireworms, lice, fleas and many animal pests. Gammexane is stated to possess the advantages of acting as a "stomach poison,"

a contact agent and a fumigant, and to be four-fifths more potent than D.D.T.

PENICILLIN BY MOUTH

A REPORT of the results obtained by the administration of penicillin by mouth in conjunction with a buffer salt (trisodium citrate) is given by P. György, H. N. Vandegrift, W. Elias, L. G. Colio, F. M. Barry, and J. D. Pilcher (*Journal of the American Medical Association*, March 17, 1945, 127, 639). The first series treated comprised eighteen males with gonococcal urethritis and five children (girls of ages ranging from three weeks to six years) with gonococcal vaginitis. The dosage varied from 10,000 units every three to four hours in children, to 15,000 to 40,000 three-hourly in adults, in combination with trisodium citrate 1 to 5 gm. per dose. Cure was obtained in all cases in one to three days. Three other cases not included in this series (girls, aged two to five years) were given 10,000 units of penicillin with 1 or 2 gm. sodium citrate four-hourly. After a total dosage of 200,000 to 300,000 units there was prompt, but only temporary, clinical cure, and a repeat treatment had identical results. The same doses given by intramuscular route three-hourly, resulted in permanent cure in each case. It is pointed out that either the oral doses were too low or the oral treatment should have been continued for a longer period, possibly with administration at shorter intervals. Gonococcal conjunctivitis in three infants of ages seven, seventeen, and forty days, was treated by oral administration of 10,000 units of penicillin with 1 gm. sodium citrate, three- to four-hourly (total doses, 140,000, 180,000 and 200,000 units respectively); the effect was prompt and smears were negative after three to four doses. A case of interest is that of a three-year old boy with chronic otitis media, with perforation and suppuration, which failed to respond to sulphathiazole. He was given penicillin by mouth, 10,000 units with 2 gm. sodium citrate, three-hourly for twenty doses, resulting in complete cure. In order to test the penicillin blood concentrations obtained by oral administration of penicillin, a number of children suffering from various illnesses (post-operative appendectomy, post-poliomyelitis, diabetes mellitus, tracheotomy, nephritis, tuberculosis, pneumonia and other conditions) were given penicillin by mouth, thirty minutes before breakfast, on a fasting stomach, in conjunction with sodium citrate and also without this buffer. It was found that when penicillin with sodium citrate was given by mouth thirty minutes before breakfast the absolute penicillin blood levels were increased and the presence of penicillin in the blood prolonged (with one exception penicillin could be detected in the blood four

hours after ingestion). When ingested on fasting stomach four hours before the first me the effect of the buffer salt was less pronounce but still apparent. In this investigation t penicillin calcium used was either in the for of the usual dry preparation in a bottle, or the form of tablets made up with sodium citra (penicillin calcium 10,000 units and sodiu citrate 1 gm. per tablet).

ERYTHEMA NODOSUM
DURING SULPHONAMIDE THERAPY

SEVERAL authors have recorded cases of erythen nodosum occurring during the course sulphonamide therapy with sulphathiazol L. Rouquès (*Presse Médicale*, April 7, 1945, 5, 180) discusses the problem of whether or n treatment should be continued on the appear ance of the nodules, and the diagnostic problem i.e., whether the eruption is a sign of septicæm or simply of intolerance to the drug. In mo cases the eruption appears on the second third treatment day, although it has bee recorded on the first day of treatment and u to the fifteenth or eighteenth day, and it appearance does not seem to bear any relatio to the dosage administered. Also the occurrenc is much rarer in patients with pneumonia an meningitis than in those being treated fo gonorrhœa. The eruption is characterized b numerous raised nodules, as a rule fairly smal in size but in some cases large, in the skin of th face and limbs, and exceptionally on the thora and abdomen. The nodules are at first red an quickly become a violet colour; they are painfu spontaneously and on pressure. Usually th eruption disappears in a few days and, as a rule there is only one outbreak. Concomitan symptoms are a rise in temperature, pains in th joints and at times redness and running of th eyes. The pathogenesis of the condition ha been a subject of much discussion. It has bee proved that the institution of a second course o sulphathiazole after an interval of some days o weeks does not cause a second outbreak although in some of the patients in this recorde series there was a rise of temperature. The question of tuberculosis arises, but the eruption is somewhat different to that seen in tuberculous subjects; the nodules are more transient and disappear without the change of colour to pale violet and yellow usual in classical erythema nodosum. X-ray examination of the lungs in these subjects is negative, and if skin reactions are positive they are weak and without the characteristic appearance of the erythema nodosum of primary tuberculous infection. Although the possibility of allergy acting on an infective basis cannot be ruled out, the curious fact remains that it is only with sulphathiazole that the eruption occurs. Nevertheless, n means

should be neglected for determining whether or not there is an underlying primary infection present, and it is only when such a possible causative factor has been eliminated that the term "sulphonamide erythema nodosum" can justly be employed.

ABSORPTION OF AEROSOL PENICILLIN VIA THE LUNGS

USING an electrically driven generator which did not raise the temperature of the solution and which dispersed an accurately measured amount, F. A. Knott and W. H. Clark (*Lancet*, April 14, 1945, I, 468) found that a penicillin aerosol remained active at room temperature for at least ninety minutes, or longer. Also, in a room of 3000 cu. ft., using a small generator, there was complete inhibition of organisms on blood-agar plates previously inoculated with *Staph. aureus* at distances of 25–30 feet. In this investigation the generator was running continuously for one hour, dispersing into the air 20 c.cm. of aqueous sodium penicillin of strength 10,000 units per c.cm. Ten minutes after starting the generator, fifteen minutes exposure at 25 feet was necessary for complete inhibition, but towards the end of the hour only five minutes or less exposure was necessary. Next the investigators sat in the room with the generator between 4 and 6 feet from the face, meanwhile breathing as much as possible through the mouth with the nose held or covered, all saliva being expectorated into a covered Petri dish and the mouth occasionally washed out with distilled water. The times of exposure varied between fifteen and thirty minutes, and on leaving the room all skin surfaces from which penicillin could be derived were washed. Before sitting down in the room the bladder was emptied and a specimen kept, and another specimen was collected fifteen minutes after leaving the room. Considerable quantities of penicillin were found in the urine excreted after fifteen minutes, or even longer, in the room. The average result of fifteen minutes exposure was urine completely inhibiting the growth of a sensitive *Staph. aureus* in dilution of 9 parts of broth to 1 part of urine, and with increased exposure up to thirty minutes concentration was obtained giving inhibition in broth 19 parts to urine 1 part. Tests on blood collected immediately on leaving the room, showed that after exposure of fifteen to thirty minutes the inhibition range with a moderately sensitive β-hæmolytic streptococcus fell between 1 in 2 and 1 in 3 dilutions of blood. The authors state that these preliminary figures show that aerosol penicillin can be absorbed in therapeutic quantities by the respiratory tract without the use of any form of mask. Possible clinical uses are the treatment at the same time of several patients in a ward without disturbing them in any way, the treatment of pneumonia, bronchial infections and carrier conditions, and in the treatment of very ill or very young patients. The method might also be of value for the production of bacteriostasis in the operating theatre when the risk of infection is great or when septic dressings are being done.

TREATMENT OF THE MENOPAUSE

IN the course of a symposium on problems of the menopause, treatment is discussed from the medical, endocrinological, and psychological aspects, respectively, by C. L. Buxton, E. L. Sevringhaus, and R. G. Hoskins (*Journal of Clinical Endocrinology*, December 1944, 4, 591, 597, 605). All three contributors emphasize the fact that it is the symptoms and signs accompanying the menopause, i.e., the menopausal syndrome, that require treatment, and not the menopause itself. Other points emphasized are the importance of a full examination to exclude such local conditions as malignancy·and such general conditions as hypertension or diabetes mellitus, and the important part played by mental and emotional disturbances in producing many of the manifestations of the menopausal syndrome. In a series of 80 cases, Buxton found that 36 were relieved by phenobarbitone, ½ grain t.d.s. half-an-hour after meals and 1 grain at bedtime. The remaining 44 patients were given œstrogens (usually diethyl or methyl stilbœstrol), and 20 obtained relief. Of the remaining 24 patients, 7 obtained relief from a combination of œstrogens and sedation treatment. Sevringhaus is of the opinion that "with very rare exceptions it is possible to relieve all the symptoms of the menopause by the use of adequate amounts of œstrogens." He prefers the oral route of administration and discusses the relative merits of the various œstrogens. Dosage varies with the individual patient and is based upon giving the minimum amount that will give relief. It is unwise to give the œstrogens to patients who have, or have had, carcinoma of the breasts or of the pelvic organs. In the present state of knowledge the best clinical guide as to the efficacy of the œstrogens is the extent to which symptoms are relieved. Thyroid is considered to be usually of little value. The use of œstrogens in women with psychotic tendencies may sometimes avert a frank psychosis. From the psychological point of view, the central feature of the menopause is anxiety, and the most potent cause of this anxiety is the threat that the menopause offers to the ego. Hoskins considers that the goal of psychotherapy is to do whatever skill and sympathy direct to allay this anxiety; the methods of achieving this he discusses in considerable detail.

NOTES AND PREPARATIONS

NEW PREPARATIONS

ORGANON LABORATORIES LTD.—New prepara-tions recently placed on the market by this firm include CORTROPHIN (adrenocorticotrophic hor-mone of the anterior pituitary); DAVITAMON B₁ SUPERFORTE (aneurin hydrochloride); DAVITA-MON E (synthetic vitamin E); METHYL THIOUR-ACIL and THIOURACIL. For further particulars application should be made to the manufac-turers, Organon Laboratories Ltd., Brettenham House, Lancaster Gate, London, W.2.

UROSELECTAN B, the original iodoxyl contrast medium in intravenous pyelography, which has been unobtainable for some time, is now again on the market. British owned and made in England at the British Schering Manufacturing Laboratories, it is issued in boxes of 1 and 5 ampoules of 20 c.cms., by British Schering Ltd., 185–190 High Holborn, London, W.C.1.

CELLONA TECHNIQUE

THE sixth edition of this booklet, dealing with the technique of plaster of Paris using cellona bandages, has just been issued. The supply is limited, but any practitioner not possessing a copy, or whose copy is out of date, should apply to T. J. Smith & Nephew Ltd., Neptune Street, Hull.

OFFICIAL NOTICE

A NOTICE has been issued by H.M. Treasury concerning the proposed removal of purchase tax, by an Order under Section 20 of the Finance (No. 2) Act, 1940, on certain essential drugs and medicines of an exceptionally costly character. Among the substances included in the list are perfumed ethyl chloride, vinyl ether, acetarsol, bismuth and mercury compounds used for injection, phenothiazine compounds, insulin preparations containing a protein other than protamine and zinc, hormone and synthetic hormone preparations, concentrated stomach preparations, amethocaine hydrochloride, di-hydromorphinone, ephedrine, hyoscine, esters and ethers of morphine, nikethamide, exophen-arsine, penicillin salts, pentose nucleotide, pethidine hydrochloride, tryparsamide and a number of other drugs. The circulation of the notice has been confined to the trade and tech-nical press, but owing to the limitation of space it is impossible here to give the list in full.

BRITISH EMPIRE LEPROSY RELIEF ASSOCIATION

A MEETING was held at the Mansion House on April 26, 1945, to mark the 21st anniversary of the foundation of the Association, and to inaugurate a campaign to raise the sum of £210,000 (£10,000 for each year of the Associa-tion's existence) for an intensified effort, by research, the provision of new clinics and agri-cultural colonies, and intensification of existing activities, to eliminate leprosy from the Empire. The chief speaker at the meeting was Sir Alfred Beit, M.P., in the absence, through illness, of Colonel Oliver Stanley, Secretary of State for the Colonies. In an address by Dr. Ernest Muir, Medical Secretary to the Association, on the work being carried on at the leper island Chacachacare, in the Caribbean Sea, mention was made of the successful preliminary use of a new synthetic drug with which spectacular results have already been obtained in advanced cases.

Whilst on the subject of anti-leprosy acti-vities it is of interest to note the measures of leprosy control in Madras, a report on which is given by R. G. Cochrane, M.D., F.R.C.P., D.T.M. & H. (*Indian Medical Gazette*, 1944, 79, 438). The author, who is Chief Medical Officer at the Lady Willingdon Leprosy Sanatorium, Chingleput, and Physician in charge of the Leprosy Department at the General Hospital, Madras, stresses the importance of research and post-graduate teaching, and the intensification of propaganda to ensure early treatment.

CONTENTS FOR JULY, 1945

ERRATUM
Mr. W. G. Scott-Brown writes:—"In discussing the treatment of allergic affections of the nose in The Prac-titioner, February 1945, 154, 89, I referred in error to "sanfoin" as a local preparation. It should, of course, have been "salfoin."

THE
PRACTITIONER

Edited by

ALAN MONCRIEFF

M.D., F.R.C.P.

JANUARY—JUNE 1945

THE PRACTITIONER

5 BENTINCK STREET, LONDON, W.1

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INDEX TO SUBJECTS

Abbreviations: *abs* = Abstract ; *NQ* = Note and Query

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